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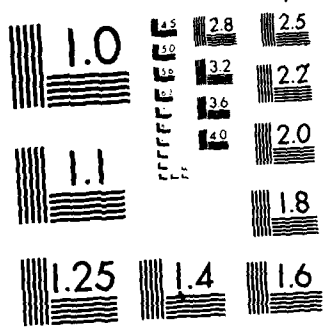
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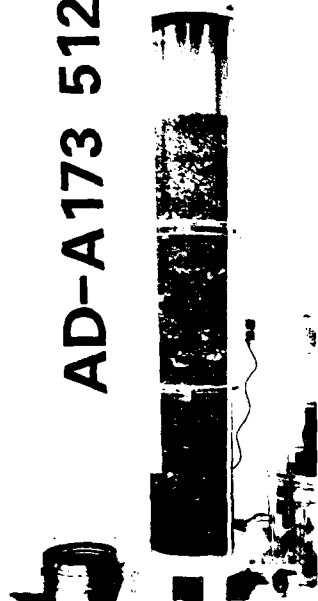


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VERIFICATION OF DESIGN AND CONSTRUCTION TECHNIQUES FOR GAILLARD ISLAND DREDGED MATERIAL DISPOSAL AREA, MOBILE, ALABAMA

by

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August 1986

Final Report

Approved For Public Release. Distribution Unlimited

Prepared for US Army Engineer District
Mobile, Alabama 36628

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SECURITY CLASSIFICATION OF THIS PAGE

ADA17352

REPORT DOCUMENTATION PAGE				Form Approved OMB No 0704-0188 Exp Date Jun 30 1986	
1a REPORT SECURITY CLASSIFICATION Unclassified			1b RESTRICTIVE MARKINGS		
2a SECURITY CLASSIFICATION AUTHORITY			3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.		
2b DECLASSIFICATION/DOWNGRADING SCHEDULE			5 MONITORING ORGANIZATION REPORT NUMBER(S)		
4 PERFORMING ORGANIZATION REPORT NUMBER(S) Miscellaneous Paper GL-86-26					
5a NAME OF PERFORMING ORGANIZATION USAEWES Geotechnical Laboratory		6b OFFICE SYMBOL (If applicable) WESGE-ET		7a NAME OF MONITORING ORGANIZATION	
6c ADDRESS (City, State, and ZIP Code) PO Box 631 Vicksburg, MS 39180-0631		7b ADDRESS (City, State, and ZIP Code)			
8a NAME OF FUNDING/SPONSORING ORGANIZATION US Army Corps of Engineers		8b OFFICE SYMBOL (If applicable)		9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c ADDRESS (City, State, and ZIP Code) Washington, DC 20314-1000		10 SOURCE OF FUNDING NUMBERS			
		PROGRAM ELEMENT NO		PROJECT NO	TASK NO
				WORK UNIT NO	ACCESSION NO
11 TITLE (Include Security Classification) Verification of Design and Construction Techniques for Gaillard Island Dredged Material Disposal Area Mobile, Alabama					
12 PERSONAL AUTHOR(S) Fowler, Jack, Blakeney, Harvey N., Hayden, Myron L.					
13a TYPE OF REPORT Final report		13b TIME COVERED FROM 1980 TO 1983		14 DATE OF REPORT (Year, Month, Day) August 1986	
15 PAGE COUNT 300					
16 SUPPLEMENTARY NOTATION Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.					
17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Channels (Hydraulic engineering) Dredged material disposal		
			Dikes (Engineering)		
			Dredging		
19 ABSTRACT (Continue on reverse if necessary and identify by block number)					
<p>A 1,700-acre, triangular-shaped dredged material island was constructed by both barge haul and hydraulic placement of the dredged material excavated from the Theodore Ship channel. Approximately 6 miles of perimeter dikes were constructed on very soft bay bottom soils at the northwest junction of the Mobile and Theodore ship channels. The dike area exposed above mean low water (mlw) was approximately 320 acres. In addition, an area exposed of about 350 acres inside the containment area was exposed at mlw. The new work dredging consisted of the removal of about 33.5 million cu yd of material. The material dredged was either hydraulically pumped or barged to the disposal area for use in constructing the dikes.</p> <p>The project consisted of dredging a deep draft ship channel about 5.2 miles long, 400 ft wide, and 40 ft deep linking the Mobile Ship Channel with the Middle Fork Deer River shoreline at Theodore, Alabama. An in'nd ship channel about 1.9 miles long, 300 ft wide,</p> <p style="text-align: right;">(Continued)</p>					
20 DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21 ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a NAME OF RESPONSIBLE INDIVIDUAL			22b TELEPHONE (Include Area Code)		22c OFFICE SYMBOL

DD FORM 1473, 84 MAR

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SECURITY CLASSIFICATION OF THIS PAGE

Unclassified

19. ABSTRACT (Continued).

and 40 ft deep was also dredged to join a 42-acre ship turning basin with a 6,500-ft-long barge channel. About 95 percent of the material dredged from the bay cut and about 52 percent of the material from the land cut was clay that readily formed clay balls. The remaining channel material was primarily sand with small amounts of shell and gravel.

The perimeter dike was constructed from an average elevation of about -9 ft mlw to about el +7 ft mlw at the crest. The width of the dike varied from 1,200 to 1,600 ft at the base. At el 0 ft mlw the dike width was from 300 to 600 ft. The average crest width of the dike was about 20 ft.

Creation of the disposal site required the construction of approximately 31,000 lin ft of dike over some extremely soft cohesive soils. The foundation soils were determined to have an undrained shear strength ranging from 50 to 100 psf. A minimum factor of safety of 3.0 was determined from dike stability based on a conventional rotational analysis. Based on conventional consolidation analysis it was estimated that about 9 ft of settlement would occur at the dike centerline. In the 2 years since construction, settlement at the dike centerline has been measured to be almost 1 ft.

The project required a thorough geotechnical investigation and numerous dike stability analyses prior to construction. In addition, specific steps were necessary to protect the environment. Because of the size and complexity of the job, similar projects were visited prior to the start of construction. These sites included the Craney Island disposal area in Norfolk, Virginia, and the Houston Bay Disposal Island in Houston, Texas. The project required 828 days of continuous work to construct the retention dikes.

The dikes were constructed of a sand, silt, clay ball, and shell matrix with slopes that varied from 1V on 32H to 1V on 61H. The dikes were constructed by hydraulically pumping and barge hauling dredged material over distances up to 7 miles. A dust pan dredge was used to dredge the soft clayey bottom material and deposit it within the dike perimeter. Verification of the design and construction techniques were correlated with measured dredged material volumes, material types, consistencies, retention rates, dike subsidence, and predicted consolidation rates.

PREFACE

This report describes the design and construction techniques for the Theodore Ship Channel new work dredging project at Theodore, Alabama.

This project was carried out for the US Army Engineer District, Mobile (MDO), by the US Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi, during the period of May 1980 to December 1983.

The research study described in this report was conceived and formulated by Dr. J. Fowler of the Soil Mechanics Division (SMD) of the WES Geotechnical Laboratory (GL) and the late Dr. T. A. Haliburton, Geotechnical Engineering Consultant. In addition, Drs. Fowler and Haliburton performed general supervision and inspection of the research construction.

Specific onsite observation and inspection activities for the construction and research project were conducted by Mr. H. N. Blakeney, Geotechnical Branch Chief, MDO, Mr. J. Tyson, Geotechnical Engineer, Mr. J. Patrick Langan, Chief, MDO, Project Operations Branch, and Mr. P. Warren, Resident Engineer, MDO. Mr. T. Love of Project Development Branch, MDO, was responsible for the contractual details along with providing general guidance and assessment of the work.

This report was written by Dr. Fowler under the general supervision of Mr. G. B. Mitchell, Chief, Engineering Group, SMD, Mr. C. L. McAnear, Chief, SMD, and Dr. W. F. Marcuson III, Chief, GL. Mr. H. N. Blakeney, MDO, and Dr. M. L. Hayden, Assistant Professor, University of South Florida, Tampa, Florida, assisted Dr. Fowler in the final preparation of the report.

District Engineer of the MDO during this period was COL Robert H. Ryan, US Army Corps of Engineers (CE), and COL Patrick H. Kelly, CE. COL Allen F. Grum, USA, was the previous Director of WES. COL Dwayne G. Lee, CE, is the present Commander and Director. Dr. Robert W. Whalin is Technical Director.



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VERIFICATION OF DESIGN AND CONSTRUCTION TECHNIQUES FOR
GAILLARD ISLAND DREDGED MATERIAL DISPOSAL AREA
MOBILE, ALABAMA

PART 1: INTRODUCTION

Background

1. The Port of Mobile is one of the largest deep water ports in the Nation and is Alabama's only seaport. Mobile was established at this location in 1702 by the French because of Mobile Bay and the interconnecting rivers. Mobile first served as the capital and a supply port for the early French Louisiana Territory and has remained an important meeting point for the shipping lanes of the world. Situated at the mouth of the Mobile River and at the head of Mobile Bay, Mobile Harbor (Figure 1) is connected to a protected waterway that extends south to Florida and Mexico. The harbor is linked to northern shipping centers by interconnecting rivers which include the Tennessee-Tombigbee Waterway System. Mobile serves as a shipping port for cities in Alabama, Mississippi, Georgia, Tennessee, and Kentucky.

2. The Mobile Bay is located in the southwestern part of Alabama on the Gulf of Mexico. Mobile Bay is about 30 miles long from the north to the south and about 8 miles wide at the north end and 20 miles wide at the south end. The Bay encompasses about 400 square miles and is relatively shallow with depths ranging from 8 to 10 ft. Tidal fluctuations in the bay vary from less than 1 ft during tides to 2.5 ft during spring tides. Because of prevailing winds and circulation patterns, tidal fluctuations in the bay are unpredictable.

3. The original Federal project adopted by Congress in 1826 to improve navigation in Mobile Bay has been modified to include a channel 42 ft deep, 600 ft wide and 1.5 miles long over the bar at the mouth of Mobile Bay; a channel 40 ft deep varying in width from 500 to 775 ft and extending 4.5 miles upstream to the Cochran Bridge, and various basins and feeder channels. The total length of the Mobile Ship channel and river channels is about 42 miles.

4. The Theodore Industrial Park (Figure 2) is located about 2.5 miles below the city limits of Mobile on the western shore of Mobile Bay. In 1943 the Federal Government dredged a 32 ft deep channel, 175 ft wide, for a

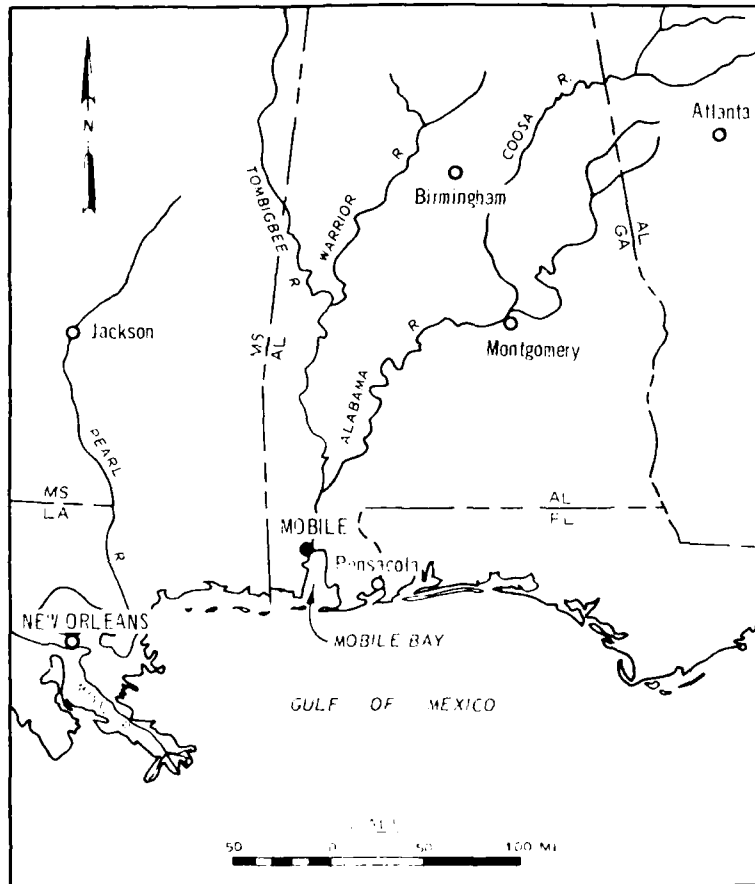


Figure 1. Vicinity map

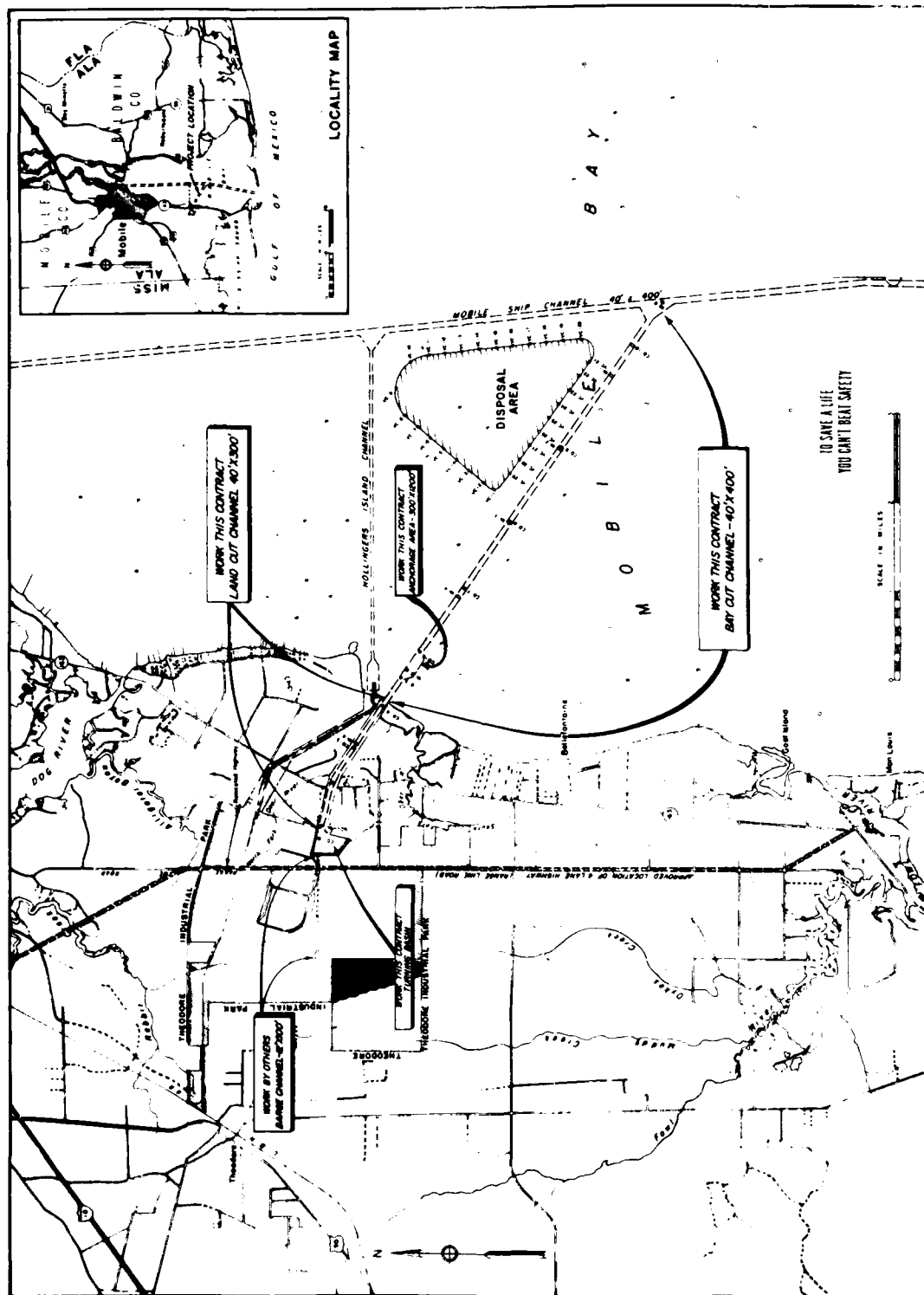


Figure 2. Project location

distance of 4 miles from the Theodore dock facilities (formerly known as the US Army Theodore Ammunition Depot) to the Mobile Bay ship channel, a distance of about 4 miles. During World War II, the Theodore Channel was used to transport munitions and explosives, but since the war commercial carriers have utilized these facilities. The Theodore Channel has been renamed the Hollingers Island Channel and is maintained to a depth of 11 ft by the State of Alabama.

5. The Theodore Industrial Park and Ship Channel was conceived as part of the overall development package along with the Tennessee-Tombigbee Waterway and the Brookley Field Expansion Area. The Mobile Harbor was almost filled and there was little room for industrial expansion (Figures 3 and 4). The concern was that after completion of the Tennessee-Tombigbee Waterway industrial expansion in the Mobile area would be curtailed without the Theodore Industrial Park; therefore, planning for the Theodore Industrial Park began. The Alabama State Docks and the city of Mobile acquired 1800 acres to form the nucleus of the park. The State Docks dredged a 12-ft barge canal up the middle fork of the Deere River (Figure 5). In 1967 the Corps of Engineers, at the request of the State Docks, widened and deepened the barge canal to accommodate deep draft ships.

6. The Theodore Ship Channel and Industrial Park is one of the largest development projects in southern Mobile County, and is expected to have a significant impact on the economy of the area. The project consisted of constructing a deep draft ship channel, 5.2 miles long, 400 ft wide, and 40 ft deep, linking the Mobile Ship Channel with the Middle Fork Deere River shoreline at Theodore, Alabama. An island ship channel about 1.9 miles long, 300 ft wide, and 40 ft deep, was constructed to join a 42-acre deep draft turning basin with a barge canal. The canal channel is about 1.0 mile long, 100 ft wide and 12 ft deep, and extends through most of the Industrial Park. An additional turning basin near the shoreline is planned for a later date. The planned turning basin is expected to provide additional docking and berthing space. As a result of this project a 1700-acre dredged material disposal island, called Gaillard Island, was constructed in Mobile Bay. Based on current projections the disposal area is expected to have a useful disposal life of 50 years.

7. The creation of the Theodore Industrial Park and Ship Channel required the removal of approximately 31 million cubic yards of material. The



Figure 3. Mobile Harbor facilities (looking north from Pinto Island)



Figure 4. Mobile Harbor facilities (looking south from Blakeley Island)



Figure 5. Theodore Barge Canal, looking east

1 magnitude of the project and the construction of Gaillard Island caused some environmental concern. The concern was primarily whether the construction of the disposal island would adversely affect the bay currents and result in an increase in turbidity of the bay. The US Army Engineer Waterways Experiment Station (WES) Hydraulics Laboratory was requested to conduct a study to investigate various designs for a disposal island and/or clusters of islands. Based upon that detailed study, a single island design was selected which would have a minimal effect on the bay currents. To monitor the environmental impact of construction on the bay, the US Army Engineer District, Mobile, set up biomonitoring stations to measure changes in such things as siltation, salinity, water temperature, dissolved oxygen, and benthic activity.

Purpose

8. The purpose of this report is to describe the earth work design and construction procedures used in the construction of Gaillard Island Dredged Material Disposal Area, Mobile, Alabama.

Scope

9. The scope of the work was to observe the behavior of the dredged materials used to construct the dikes in open water, to correlate the final embankment slopes with different soil properties and classification, to observe retention rates of the various materials used to construct the dikes, and to determine consolidation and displacement of the dike foundation. The performance of various dredging techniques used in the construction of the embankments is evaluated. Embankment stability, slope protection, and observations of the mud flow of fine-grained dredged materials are addressed.

PART II: STATEMENT OF PROBLEM

10. A 1300-acre dredged material containment area (Gaillard Island) was to be constructed in the Mobile Bay near the Mobile District office. This area is about 8 miles south of Mobile, Alabama, and 2 miles east of the western shoreline. The project required the construction of a retaining dike approximately 6 miles long and from 8 to 10 ft in height. The dike was constructed using hydraulically placed new work dredged material. The dredged material consisted of various combinations of sand, clay and clay balls.

11. Foundation soils in Mobile Bay consisted of a wide range of soil types including very soft highly organic clays. The presence of these soft organic clays caused conjecture during the planning and design phase whether the necessary embankments could be constructed. This problem was compounded by the fact that very little information was found in literature to aid in the planning, design and construction of the project.

12. A number of dikes have been constructed by the Corps of Engineers (CE) in the past using hydraulically placed dredged material; however, little information was available for these projects. Most CE designs using hydraulically constructed levees in the past have (1) been overdesigned, (2) failed, and/or (3) resulted in construction delays causing large construction claims. This study was undertaken to answer the following questions concerning hydraulically constructed dikes: (1) the retention rate of different types of dredged materials pumped over varying distances, (2) the dike slopes, both initial and final, that can be constructed with different soil types and consistencies, (3) the magnitude of bottom displacement and consolidation likely to occur with varying dike heights and foundation conditions, and (4) the performance of various dredging equipment and dredged material placement techniques.

13. An effort was made to correlate the material properties of the dredged material (i.e. grain size, plasticity etc.) with shear strength parameters determined by standard penetration and vane shear testing soil strength. It is believed the knowledge gained from this project could help predict the behavior of dredged material and alleviate many of the environmental concerns. A more economical and environmentally accepted dredged material disposal area could result from this study.

PART III: HISTORICAL AND LITERATURE REVIEW

Introduction

14. Few earth dikes have been successfully constructed below water on soft foundation using new work dredged material that consists of approximately 50 percent sand and 50 percent silts and clays. Because of this fact a hydraulic model and environmental impact study was made and evaluated prior to design and construction. There was considerable concern during the planning and design as to whether an embankment could be successfully constructed without large foundation displacements. A large displacement of the foundation could block the Mobile Ship Channel and cause excessive turbidity and mud flows during construction. Several large embankments, such as the Fort Peck Dam in Montana, Franklin Falls Dam in Massachusetts, and Sardis Dam in Mississippi, have been successfully designed and constructed by the Corps of Engineers by using large volumes of fine-grained dredged material.

Craney Island

15. Prior to the design of the Gaillard Island Disposal Area, personnel of the Mobile District visited several Corps of Engineers Districts which had experience in constructing dredged fill embankments on soft foundation soil. One of the sites visited was the Craney Island dredged material disposal area, located at Norfolk, Virginia. This disposal area was constructed in the mid-1950's and is similar to that proposed for Gaillard Island Disposal Area. Craney Island is a 2500-acre disposal area encompassed by a 6-mile perimeter dike. The dike was constructed by depositing select borrow material in water about 10 ft deep. Dike construction was interrupted on several occasions because large mud waves formed during dredged material placement along the dike alignment preventing the spill barge from discharging dredged material in the proper location. A dredge was used to remove these mud waves and allow construction to continue. One of the most difficult tasks during construction was joining the perimeter dikes together near the end of construction. Tidal fluctuations interfered with the final linkage for several days. Once the dredged material was placed along the dike alignment, draglines were used to construct a riprap protected sand fill levee and roadway around the

containment area. A typical cross section of the main levee after construction of the Craney Island Disposal Area is shown in Figure 6.

16. The Craney Island Disposal Area was originally designed to contain dredged material from the Hampton Roads area. The design was an economical alternative to transporting and ocean dumping the dredged material. The perimeter dikes have been constructed to about el 20 ft msl of dredge material within the containment area has been raised to an average elevation of 15 ft msl. To allow for improved management and storage capacity for dredged material, the dikes will be raised to about el 30 ft msl with the site being subdivided into three 800-acre containment areas.

Construction Experience by Others

17. Mobile District personnel visited several flood control levees in the New Orleans and Galveston area that were successfully constructed above water. Small toe dikes were used to contain the dredged material during construction. The new work dredged material used to construct the dikes contained varying amounts of sand and clay. Dike subsidence caused by lateral spreading and consolidation of peat and the very soft foundation soils have caused problems with this type of construction in the New Orleans area. After the embankments were allowed to settle, the side slopes were reshaped and the crest heights raised. Dike construction using clay balls (balls formed when large clay cuttings roll along the dredge pipe and developed into various sizes and shapes) have been successful in these areas. Clay balls can be stacked on very steep slopes with the voids between the clay balls filled with sand, silt, and clay. This construction technique forms a strong clay matrix immediately which is capable of supporting the light-weight equipment necessary to reshape the dikes.

18. Construction experience by personnel of the Coastal Engineering Research Center, Fort Belvoir, Virginia, indicated that several embankments have been successfully constructed above and below water with new work dredged material, but no information was available concerning the design and construction procedures used. Construction personnel indicated that if enough sand was available and if clay balls would form and stay together without eroding and/or abrading into small pieces, a dike could be constructed in water 8 to 10 ft deep with moderate current velocities.

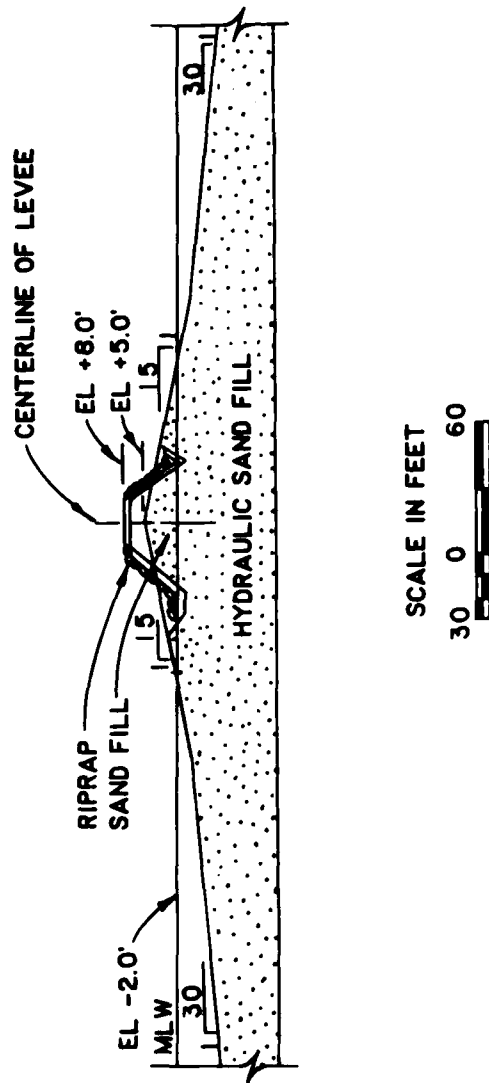


Figure 6. Cross section of main levee-Craney Island disposal area

19. In an attempt to validate some of the proposed construction techniques during the design phase, the Mobile District decided to construct a test embankment along a section of the proposed dike alignment. An area was chosen where foundation conditions and dredged material fill were considered to be the "worst case". A description of the test embankment and results are given later in this report.

PART IV: DESIGN OF RETAINING DIKES

Introduction

20. Authorization to construct and maintain an access channel for deep draft ships and barge traffic into Theodore Industrial Park was provided in October 1976 by Section 112 of the Water Resources Development Act of 1976 (PL 94-587). This plan called for modifications of the Federal project for the Mobile Harbor, Alabama, to include (1) a channel branching from the Mobile Ship Channel in Mobile Bay extending northwesterly to the western shore of Mobile Bay and then inland by land cut, (2) an anchorage and turning area along the channel at the bay shoreline, (3) a trapezoidal shaped ship turning basin within the Theodore Industrial Park, and (4) a barge canal extending another 6500 ft inland. This work was authorized by the Board of Engineers for Rivers and Harbors in May 1976 and approved by the Chief of Engineers in January 1977 to proceed with the Phase II study and preconstruction planning which provided the design criteria, construction methods, and cost for the proposed project.

21. Project location. Mobile Bay is located in the Gulf of Mexico approximately 120 miles east of New Orleans, Louisiana. The Theodore Ship Channel is located about midway between Mobile, Alabama, and the Gulf of Mexico on the western bayshore as shown in Figure 7. The existing Mobile Ship Channel is about 31 miles long, beginning at the bay entrance and terminating at the lower reach of the Mobile River. Theodore Ship Channel extends in a northwesterly direction from Mobile Ship Channel for about 5.3 miles to the western shore of Mobile Bay. From the shoreline, it extends inland about 1.9 miles to a ship turning basin in Theodore Industrial Park. The ship channel, turning basin, and barge canal are shown in Figure 2.

22. Design of the Theodore Ship Channel dictated the use of many necessary engineering disciplines and numerous design considerations before construction could actually start. Hydraulic model testing, environmental monitoring, and geotechnical investigations were part of the broad areas of consideration.

Hydraulic Model Testing

23. Hydraulic model testing was provided by the WES (TR H-75-13).¹ A

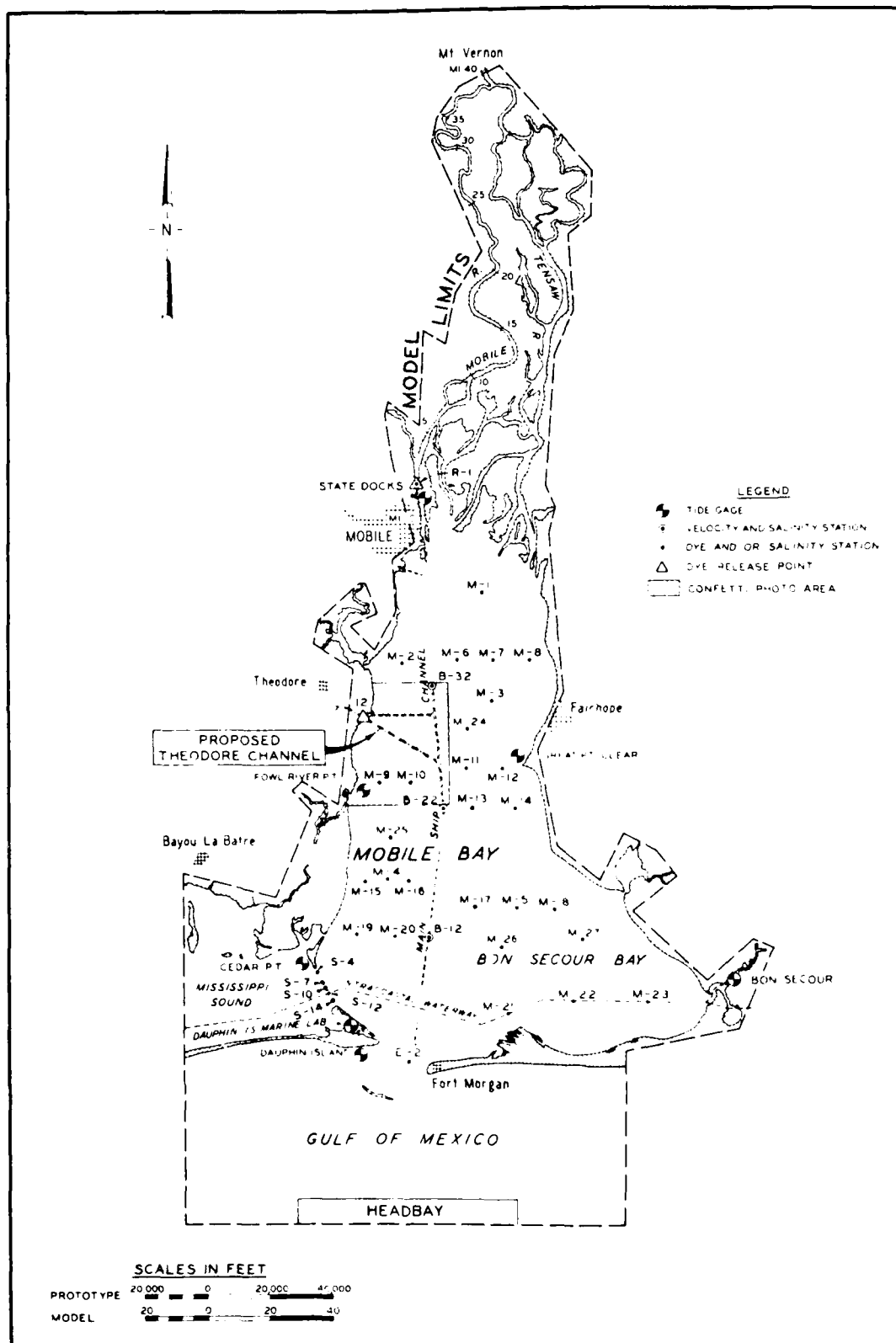


Figure 7. Location map

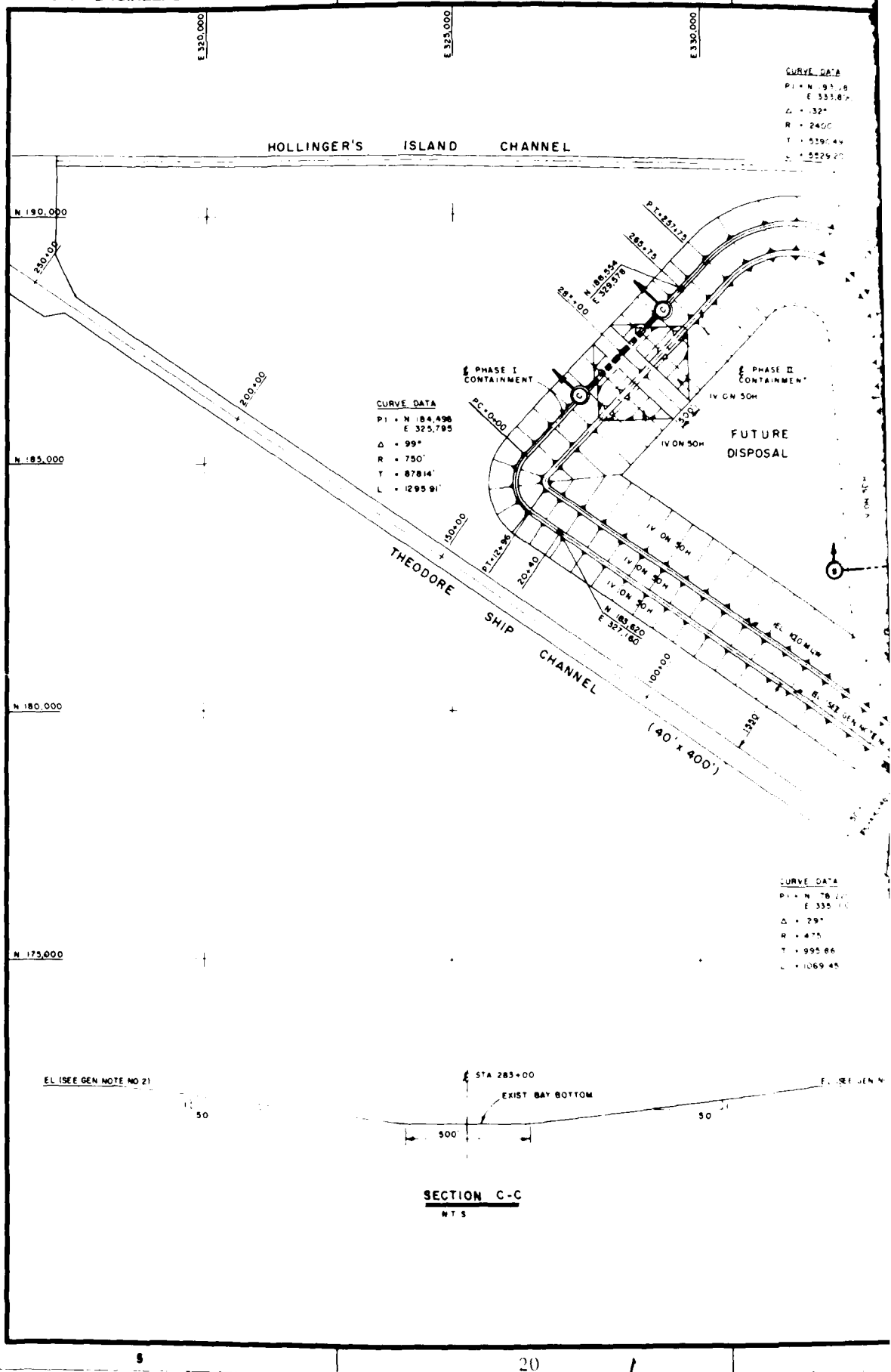
fixed-bed model of Mobile Bay was constructed, simulating an area of about 268 square miles. The model included the tributaries of the Tensaw and Mobile Rivers and an area beyond Dauphin Island into the Gulf of Mexico of about 40 miles shown in Figure 7. The hydraulic model was equipped with the necessary instrumentation to provide an accurate reproduction and measurement of the tides, tidal currents, salination, fresh water inflows, density effects, and other important prototype phenomena.

24. The purpose of the study was to determine the effects of the ship channel and dredged material containment area on flow patterns that would affect subsequent maintenance dredging and the oyster industry at the lower end of Mobile Bay. Nine island configurations were considered for the disposal island. The hydraulic model tests furnished to the Mobile District contained a rating system which incorporated parameters such as navigation, economics, environmental effects and esthetics. An analysis conducted by the Mobile District, indicated that a triangular shaped island located west of the Mobile Ship Channel and north of the proposed Theodore Ship Channel, as shown in Figure 8, was the most desirable.

Environmental Considerations

25. Prior to construction of Gaillard Island, an environmental impact statement was provided by the Mobile District. The statement addressed the environmental concerns associated with the construction of the project in relation to the physical alteration of the Mobile Bay system, loss of natural resources, and water quality consideration. A model was constructed by the WES (TR H-75-13) to evaluate the effects of the Theodore Channel and Gaillard Island on circulation and salinity. From the model studies, it was determined that an offshore island would minimize the concentration of existing salinity patterns in the Bay. Since construction of the dikes for the new disposal island was to be accomplished using new work dredged material, the Mobile District concluded, that construction and operation of the project would not cause significant long-term adverse effects on the quality of the bay waters. It was further concluded that water quality would only be impaired briefly from suspended solids and turbidity during the construction and stabilization period.

26. An environmental monitoring program was established to verify the



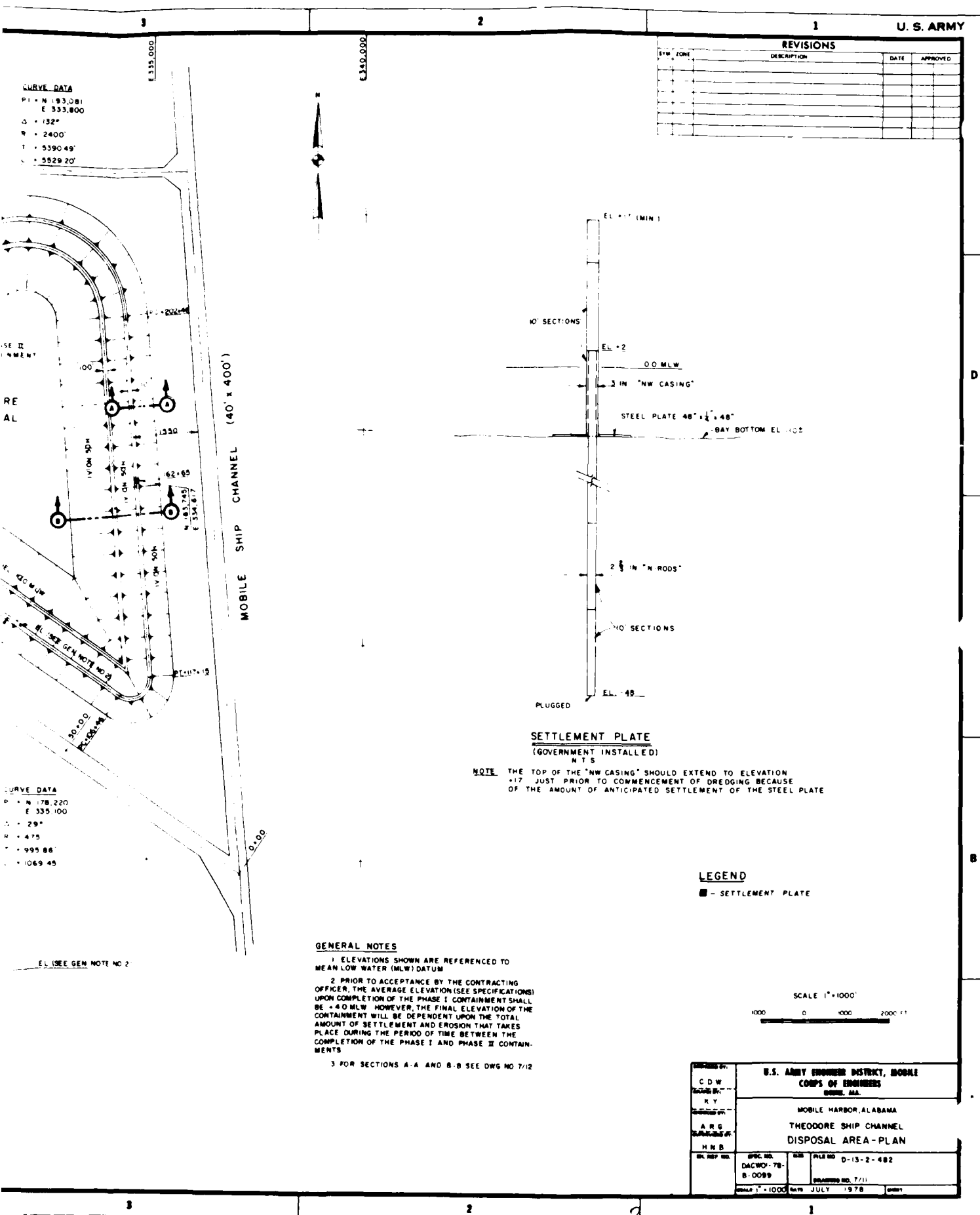


Figure 8

hydraulic model predictions and to determine the environmental impact resulting from construction of the project. The monitoring program consisted of baseline studies conducted from October 1977 to October 1978 to document existing conditions of the area. Monitoring for the project continued for about three years following the baseline study which had included one full seasonal cycle after the project was constructed.

27. Elements monitored in the program included turbidity, salinity, temperature, dissolved oxygen, submerged grasses, macroinfauna and demersal fauna. Dissolved oxygen was also monitored in the land cut section of the channel. Turbidity and mud flows were checked periodically during construction. An environmental report is being prepared by the Mobile District.

Gaillard Island Test Fill

28. During the planning and design phase, the Mobile District decided to construct a test fill along the proposed alignment. After careful examination of the boring logs and subsurface data, a decision was made to excavate material from about sta 40+00 in the channel and to deposit this material at about sta 90+00 along the dike alignment. Figure 9 shows the location of the excavated area, the test fill section, and a profile plot of the surface elevation data collected from June 1975 to March 1977. Earlier attempts to construct a dike with a bucket dragline failed because of rapid subsidence. The final section was constructed with a hydraulic dredge; the fill material consisted of very soft bay bottom deposits and a considerable amount of oyster shells that were subsequently mined by local oyster shell suppliers. The locations chosen for the test fill and excavation sections were considered to be "worst case" conditions. The test embankment was constructed to about el 2 ft mlw; however, after a heavy windstorm and consolidation and spreading of the soft dike and foundation material, the dike had settled about 1 ft during the first month after construction and about 3 ft during the first year. Two years after construction, the dike settled a total of 5 ft as a result of settlement and erosion. The shell dredging occurred subsequent to this and the entire fill was removed leaving a hole in the bay bottom. The conclusions from this test were that an embankment could be constructed over the worst probable foundation conditions using the worst probable fill materials. Even though the embankment test section settled or eroded below mean low water, the

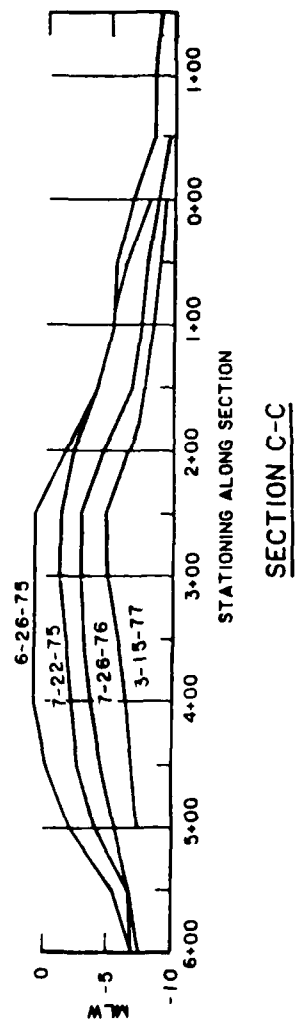
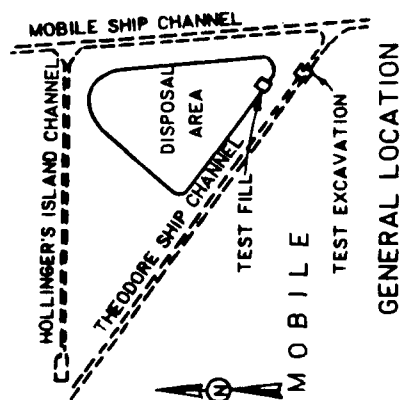
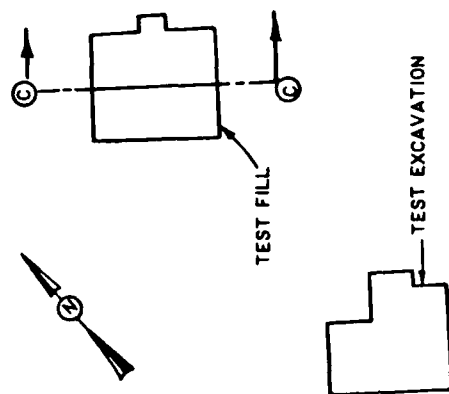


Figure 9. Theodore Ship channel test fill

embankment slopes before and at various times after construction were about the same, indicating that a stable slope was somewhere between 1V to 40H and 1V to 50H.

Proposed Dike Design

29. The initial design concept was to hydraulically place land-cut dredged material along the peripheral rim of the proposed disposal area, to about el+2 ft mlw as the first phase of construction. The material would then be shaped to about el+4 ft mlw with draglines placed on the fill. It was assumed that the embankment base width would vary from 1000 to 1200 ft with side slopes varying from 1V:30H to 1V:50H. This small dike would serve to retain the fine-grained material dredged from the bay bottom; in addition to serving as the foundation for the planned dike raising in Phase Two. During Phase Two the retaining dikes will be raised to el 10 ft mlw. Shown in Figure 8 is a plan view of the proposed dike design depicting the first and second phase construction slopes and limits of the proposed shore protection. As shown in Figure 8, a 500-ft-wide weir or gap was proposed to be left open during dike construction and closed at the end of construction. A cross-section of the proposed weir, dike, and shore protection is shown in Figures 8, 10, and 11, respectively.

Geology

30. The Theodore Ship Channel is located in the Pine Meadows subdivision of the East Gulf Coastal Plain Section. This region ranges in elevation from sea level to about el+100 ft msl and is characterized by low rolling hills developed on Pleistocene and Holocene terrace alluvial and beach deposits. These deposits overlies older Miocene and Pliocene beds which form the high ground that flanks Mobile Bay to the east and west. The Holocene deposits are normally 20 ft thick except in Mobile Bay where they are 150 ft thick. Lithologically, the Pleistocene and Holocene deposits consist of white, gray, orange, and brown very fine to coarse-grained gravelly sands which are partly carbonaceous. Very soft to firm clay beds also occur with these beds making up a large portion of the material underlying the Mobile Bay. Dredged material excavation occurred in these Pleistocene and Holocene deposits.

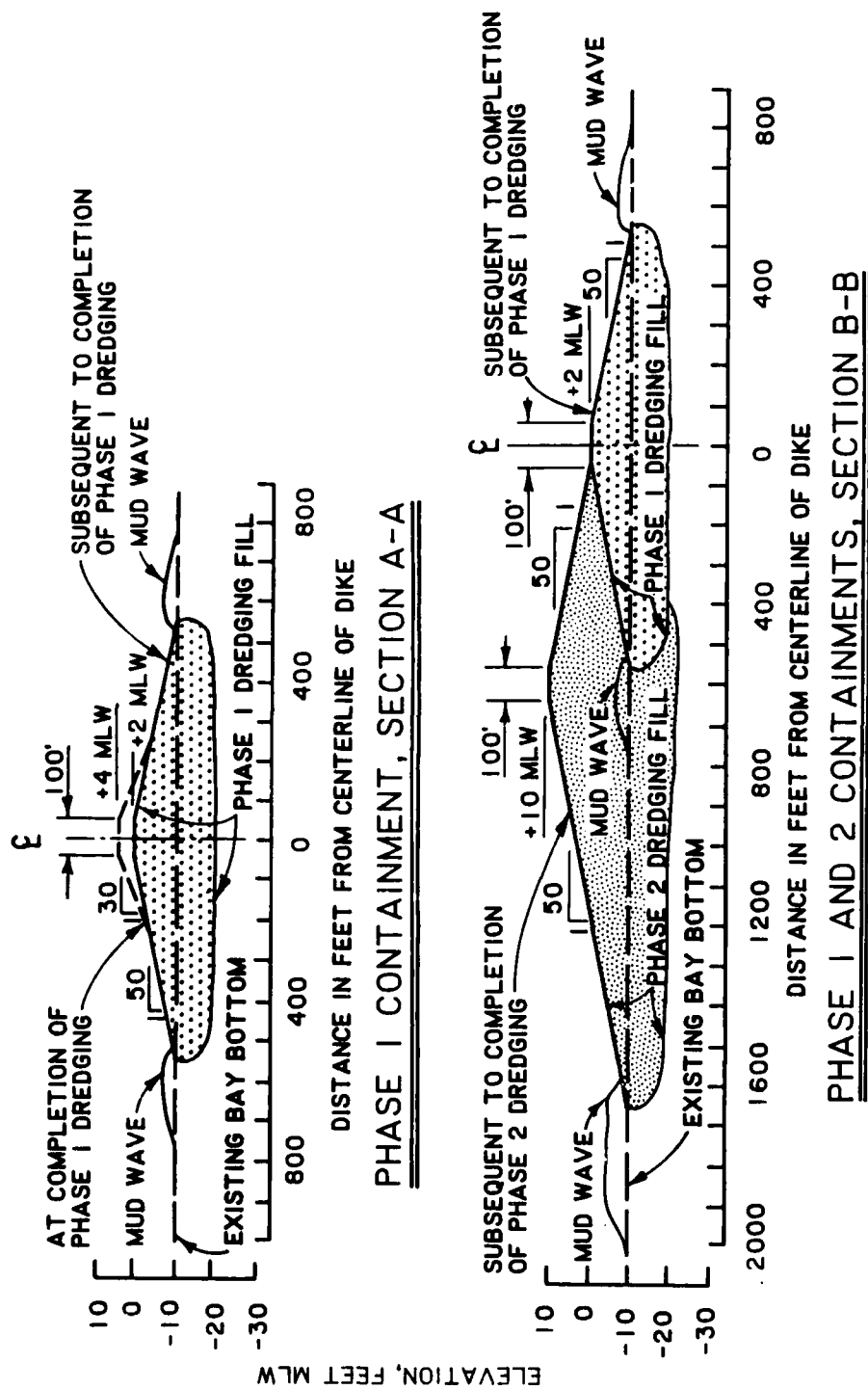


Figure 10. Theodore Ship Channel Phase I and Phase II

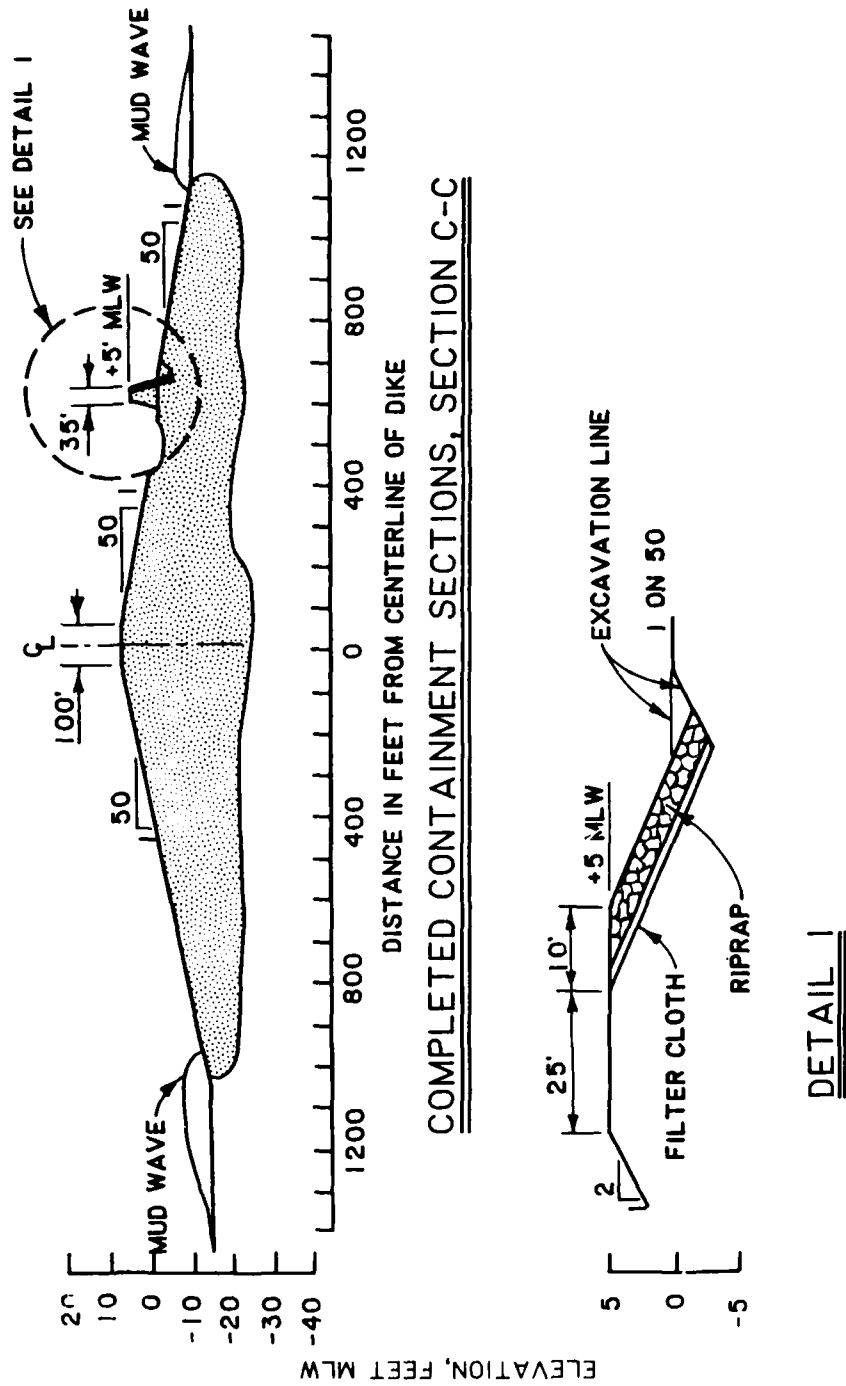


Figure 11. Theodore Ship channel completed dike and rip rap protection

31. Prior to construction, a geological and subsurface soil investigation was conducted by the Mobile District and is reported in reference 2.

Soil Description

32. The description of the soils to be removed from the Theodore Ship Channel have been divided into two classifications for discussion. These two classifications are land-cut and bay-cut soils.

- a. Land-cut soils. Material defined as land-cut soils may be subdivided into those from the barge channel extension and those from the ship channel and turning basin.
 - (1) Barge channel extension. Soils from the barge channel extension area will not be discussed in this report since these were not used to construct the dikes. They were dredged and placed in a nearby upland containment area.
 - (2) Ship channel and turning basin. Soils from the ship channel ranged from fat, highly plastic clays (CH) to poorly graded sands (SP). The sands varied from very loose to medium dense near the surface and generally increased in density with depth. The clays were gray in color and ranged from very soft to very very stiff. A generalized profile of the soils (to the maximum dredged depth of about el -44 ft mlw in the ship channel) consisted of 10 ft of silty or clayey sand (SM/SC) at the surface and underlain by 10 to 25 ft of either a poorly graded silty sand (SP-SM), or a soft fat clay (CH), or a combination of both. Underlying these soils was generally a firm to a very stiff fat clay (CH) which became stiffer with depth. A few borings indicated the presence of a poorly graded sand (SP) instead of the clay below about el -14 ft mlw. The soils dredged from these areas were considered to be a better construction material than those from the bay-cut area, since they contained a greater amount of sand. The sandy soils (SC, SM, SP-SM, SP) comprised approximately 48 percent of all material dredged from the ship channel and turning basin area. The remaining 52 percent was predominantly a fat clay (CH) with small lens of low plasticity clay (CL).
- b. Bay-cut soils. The soils from the bay-cut area were predominantly fat, highly plastic clays (CH) with isolated pockets of shells and fine sand. The percentage of sand in these clays were generally less than that found in the land-cut clays. The bay-cut clays were gray in color and varied in consistency from soft to stiff. The clays were normally consolidated with a high degree of sensitivity. Generally, the upper 4 to 6 ft of material in this area was flocculated with a consistency of "thick soup". Below this very soft material was a soft fat clay (CH) which varied in thickness from 15 to 20 ft and

contained pockets of sand and shells. The remaining soil extending down to the final cut excavation, was a medium to stiff clay which became firmer with depth. Intermittent sand and silt lens up to 2 ft thick were sandwiched in the clay (CH). In an area near the shore of the turning basin, the presence of sand was noted on some of the boring logs to a depth of several feet.

Subsurface Investigation

33. An extensive exploratory soil boring program conducted for the foundation design consisted of making 107 borings. Soil borings were located from 500 to 1000 ft along the ship channel and dike alignment on 500 to 1000 ft intervals as shown in Appendix D of Phase II General Design Memorandum (GDM), Design Memorandum No. 2, Mobile District. Subsurface investigations were conducted with both Vibracore and split-spoon type samplers. Samples in the bay were taken with a Vibracore sampler to a depth of 30 ft and with a split-spoon sampler below 30 ft. Samples in the land-cut area were obtained either with a Vibracore in the upper 30 ft and with a split-spoon below that or, where the water was above the soil surface, the split-spoon sample was used entirely.

Laboratory testing

34. Most of the Vibracore samples were classified in the field; whereas, the split-spoon samples were sent to the South Atlantic Division (SAD) laboratory for classification and/or water content determinations. Some of the samples were tested by private firms. Atterberg limits, gradation, and moisture contents were determined for selected Vibracore samples. A Torvane device was utilized to assist in determining and evaluating the material consistency. Most of the laboratory testing conducted during the Special Report and Phase II GDM(2) stage on Theodore Ship Channel consisted of water contents, Atterberg limits, and grain-size distribution. In addition, Q, R, and \bar{R} triaxial tests and direct shear tests were conducted on select samples to evaluate the strength and consolidation characteristics. The results of the laboratory tests are presented in Appendix D of Phase II GDM(2). Most of the laboratory data has been included in a geotechnical data base discussed later in this report.

Proposed Shore Protection

35. The shore protection proposed consisted of both riprap and vegetation. Riprap was to be placed along the east leg of the island adjacent to the Mobile Ship Channel and around the northern and southern edges also adjacent to the Mobile Ship Channel. The other sides of the island located to the west and away from the long reaches of Mobile Bay and the ship traffic were to be protected by vegetative cover only. A plan view of the shore protection proposed is shown in Figure 12. The riprap section was to be constructed after the main dike section was built to grade. A cross-sectional view of the proposed shore protection is shown in Figure 11.

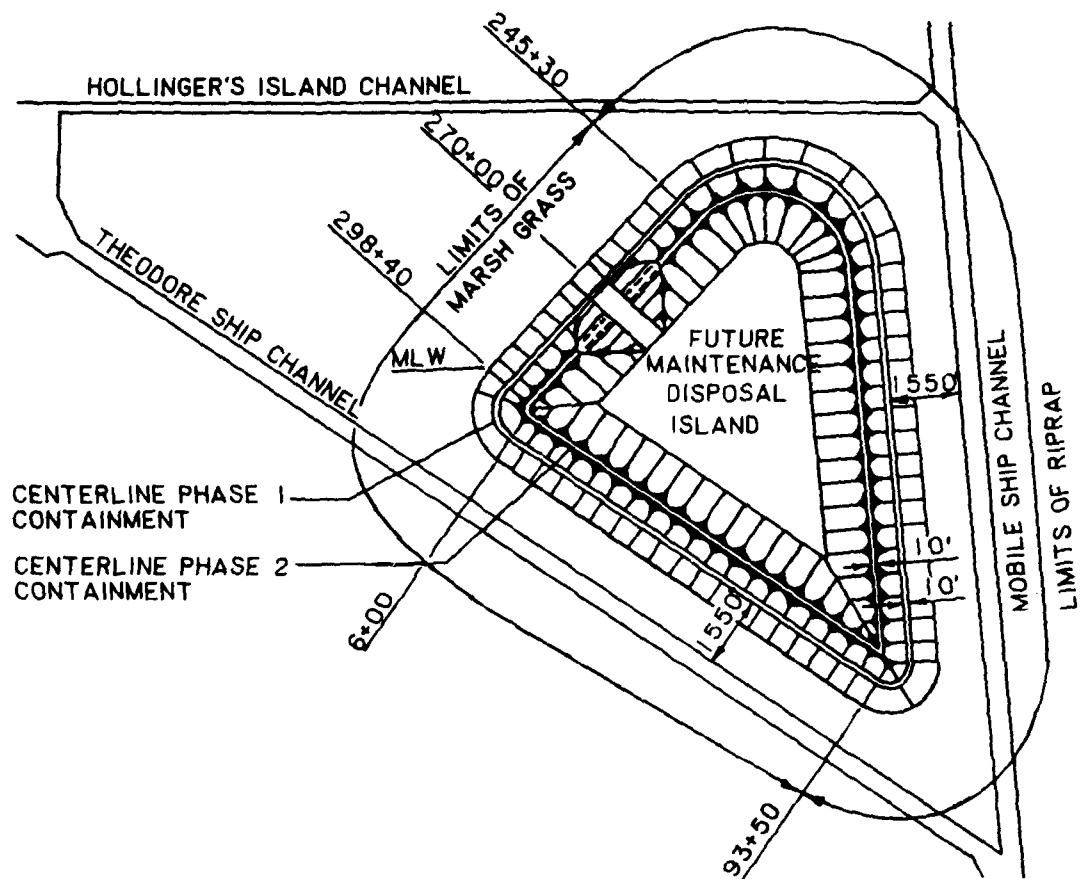


Figure 12. Plan view of proposed design and shoreline protection for Theodore Ship Channel Disposal Island

PART V: CONSTRUCTION OF CONTAINMENT DIKES

Introduction

36. During the construction of the containment dikes a number of problems had to be solved. The solution of these problems required a cooperative effort between the dredging contractor and the MDO. Work began on 24 May 1979 with clearing and grubbing of the land-cut areas. The work was completed 828 days later on 28 August 1981. Approximately 33.5 million cubic yards of dredged material was either barge hauled or hydraulically pumped over 7 miles to the construction site. The dredging contractor was the Bean Dredging Corporation of New Orleans, Louisiana.

Clearing and Grubbing

37. Clearing and grubbing the construction limits of the ship channel, the turning basin, and the diked area was the first priority. Documentation of the construction activities for the barge canal and upland containment area dikes will not be discussed in this report. Clearing and grubbing of the upland construction area proceeded in an easterly manner and consisted of removing all obstructions by hauling away or burning. Work on the upbank drainage protected drainage ditches, slope grading, and grassing of the slopes proceeded prior to and during the dredging operations.

Hydraulic Dredging Equipment

38. The major hydraulic dredging equipment consisted of two cutter-head dredges, three booster pumps, and approximately 7 miles of 27-in diameter dredge pipe. Assisting the hydraulic dredges was a dust-pan dredge which was used to remove the soft bay bottom deposits from the Theodore Ship Channel and dispose it about 1500 ft away along the south leg of the disposal island. A number of crew boats, dozers, fork-lifts, draglines, cranes, skidders, barges, spud barges, and spoil discharge barges were used to assist in this operation.

Description of cutter-head dredges

39. Two hydraulic cutter-head dredges were used. Both dredges, the Jim Bean and the Dave Blackburn, were capable of excavating to the maximum

required dredge elevation of -42 ft mlw. The Jim Bean was moved in from Tampa, Florida, to begin dredging on 29 November 1979 and remained until completion on 28 August 1981, with the exemption of a temporary move to another project from 17 April 1980 to 3 January 1981. The Dave Blackburn was moved in from New Orleans, Louisiana, and began dredging on 8 January 1980 and remained on the project until completion on 28 July 1981.

40. The Jim Bean dredge was designed and constructed by the Bean Dredging Corporation in 1974 at a cost of about \$13 million. The Jim Bean is a 9200-BHP diesel-powered dredge with many modern features; such as electrohydraulic controls, hydraulic winches and motors, and electronic range and depth recording equipment. The dredge is sixty-five ft wide and 262 ft long and capable of dredging in fairly rough open water. The estimated dredging capacity is about 1450 cu yd per hour at a discharge pressure of from 220 to 240 psi through a 29-in. diameter inlet and a 27-in. diameter discharge pipe. Three on-board centrifugal pumps and one booster pump were used to pump dredged material from the turning basin to Gaillard Island over a distance of about 7 miles. The booster pump was located about halfway between the dredge and the spill barge. The dredge ladder or boom for the cutter-head was about 140 ft long. Operating costs for this dredge were estimated to be about \$1200 per hour with an average pumping rate of about 900,000 cu yd per month.

41. The Dave Blackburn dredge cost about \$3 million to build in 1957. This dredge was originally owned by the Corps of Engineers (New Orleans District) and later sold to the Bean Dredging Corporation. The Dave Blackburn is a 3750-BHP diesel-powered dredge with an inlet diameter of 29-in. and a discharge diameter of 27-in. and is capable of dredging and pumping about 1200 cu yd of material per hour at a discharge pressure of from 70 to 150 psi. The dredge is 180 ft long, 52 ft wide, and sits low in the water; therefore, restricting its use in rough water. The ladder or boom length for this dredge was about 86 ft long which was adequate for the 42-ft dredging depth required. Operating costs were estimated to be about \$900 per hour with an average pumping rate of about 700,000 cu yd per month. Because the Dave Blackburn had only one centrifugal pump on board, the first booster pump had to be positioned close to the dredge with the second booster pump positioned about half way to the spill barge.

Description of dust pan dredge

42. The Lenel Bean, a dust-pan dredge, was moved to the project site at

the request and expense of the Bean Dredging Corporation. Dust-pan dredges were designed primarily to remove point bar deposits of sand in the Mississippi River; however, the Bean Dredging Corporation believed that the use of dust-pan dredge could efficiently remove the soft clay deposits. After considerable discussion as to the environmental impact of using a dust-pan dredge to remove soft clay deposits, it was decided that dust-pan dredge could be used on the outer portion of the cut adjacent to the ship channel where the materials were extremely soft and considered unsuitable for use in dike construction. It was also decided that the high pressure water jets used to break up and stir the material prior to being sucked in to the dust pan could be used; however, the valuable oyster beds downstream required careful monitoring.

43. The Lenel Bean pulled itself forward and backward along the channel alignment with long cables anchored in the deeper and stiffer clays. The dredge was located and positioned electronically by an onboard computer and two electronic survey points located on the western shore of Mobile Bay. Dust pan dredges are usually controlled by the use of propellers; however, in this case both stern anchor lines and propellers were used. The dredge would scoop up bottom material 1 to 2 feet deep and 30 feet wide on each pass which was approximately one thousand feet long.

44. The Lenel Bean was capable of dredging an average of 1,200,000 cu yd of material per month from the Theodore Ship Channel. The dredge was designed to pump material a maximum distance of 2500 ft without the use of a booster pump. The Lenel Bean is a relatively new and modern dredge with a 3600 BHP diesel motor with a centrifugal pump that has a 40 in. diameter suction line and a 38 in. diameter discharge line. The Lenel also has a 750 BHP jet pump that is used to stir the material beneath the dust pan. The Lenel Bean is 252 ft long and 40 ft wide with a ladder length of 79 ft.

45. The Lenel Bean was used on the outer portion of the cut area adjacent to the Mobile Ship Channel. The primary reason for experimenting with a dust pan dredge was to reduce costs. The unexpected escalation in fuel costs which occurred during the contract period required the contractor to investigate ways to reduce the costs. The Lenel Bean was used since the material in this portion of the channel was too soft for use in the construction of the dikes and the water was fairly calm. The dredged material was pumped about 1500 ft to the southeast corner of the containment area and over the outer

dike. The material was placed at this location to strengthen the corner against wave attack. The use of the Lenel Bean was successful in reducing costs.

Booster pumps

46. Three large pumps were used to assist the Jim Bean and Dave Blackburn dredges. Each booster was appropriately located along the 27-in. diameter pipeline to keep the dredged material moving. Each booster pump was diesel-powered and mounted on a 40 ft wide and 140 ft long barge. One of the booster pump barges contained one centrifugal pump and a 3600-BHP diesel engine while the other barges contained two centrifugal pumps and either a 3600 or 4000 BHP diesel engine. The 3600-BHP booster pump was capable of providing a discharge pressure of about 200 psi, while the 7200 BHP pump provided a pressure of about 250 psi and the 8000-BHP pump provided a discharge pressure of from 290-335 psi. The 3600- and 7200-BHP pumps were about 9 years old, while the 8000-BHP pump was new. Each booster pump was valued at approximately \$1.5 million. Operating cost for the 3600-BHP pump was about \$150 per hour while the operating costs for the 7200- and 8000-BHP pumps was about \$200 per hour a piece. Each booster pump was capable of maintaining the necessary pumping rate required of the Jim Bean or Dave Blackburn dredges. The pumps required continual repair because of the high sand content contained in the dredged material and long pumping distances required. The booster pumps were monitored constantly to detect breaks in the pipeline. The dredging crews were in constant radio contact with the booster barge work crews to prevent pump damage which could result from cavitation and/or a break in the pipeline.

Discharge Barges

47. Two specially constructed discharge barges were designed by Bean Dredging to assist in placement of the dredged fill. The discharge barges were 220 ft long, 60 ft wide and capable of discharging over a distance of 280 ft through a 27 in. diameter pipe. A photograph of the discharge barges is shown in Figure A10. Mounted on the barge was a 140 ft boom that was winch operated to raise and lower the discharge pipe to the desired height. Positioning and locating the barge was controlled by anchors and vertical spud poles that could be raised and lowered in the soft bay bottom. Tow boats were

also used to change the barge and anchor location when the barge moved too far off the dike alignment. These boom mounted discharge barges were some of the largest ever constructed for the Corps of Engineers.

Associated equipment

48. There were over 20 different crew and tug boats used on the project during construction. Over 20 flat-deck barges were used to haul dredged material from the turning basin to Gaillard Island. Equipment used to assist in this operation included a bucket dredge barge, dragline barges, crane barges, derrick barges, spud barges, fuel barges, and equipment barges. Several dozers and survey skiffs, a survey boat, a skidder, and a forklift were used in clearing, grubbing and handling the dredge pipe. Nine large draglines were used at various times throughout the project for clearing, grubbing, handling dredge pipe and equipment; in addition, to loading the barges with dredged material from the turning basin. This listing includes only the major items generally reported by the contractors; however, a large number of small items (i.e. trucks, pumps, motors, welding machines, tools, etc.) were used which will not be discussed in this report.

Hydraulic Dredge Construction Sequence and Placement Techniques

49. Construction of the Theodore Ship Channel proceeded easterly from the upland construction limits within the turning basin in Theodore Industrial Park. The hydraulic dredges utilized were the Jim Bean, Dave Blackburn, and the Lenel Bean. Each dredge operated within the Theodore Ship Channel at various times throughout the project. The initial plan was to construct an outside perimeter dike, during Phase I, and then construct a higher dike on the inside during Phase II as shown in Figure 10. However as dike construction progressed different sections of the dike constructed during Phase I either settled or were overtopped by wave wash, thus requiring the initial plan be altered. Instead of building up the Phase I dike during Phase II with a dragline as planned, dredged material for the second pass was needed on top and to the inside of the dike to compensate for the settlement and overtopping which had occurred.

50. The Jim Bean dredge began dredging at the mouth of Deere Creek on 29 November 1979 at Station 220+00 and proceeded in a westerly direction. The dike construction for Gaillard Island began with the Jim Bean depositing

dredged material at dike station 268+00 and proceeding in a northerly direction. Initial pumping distances were about 10,000 ft, but as the Jim Bean dredge moved inland and the discharge barge moved north along the dike perimeter, a maximum pipeline distance of 34,565 ft was recorded. The first dredging operation report was recorded on 29 November 1979; however, the contractor had been working previously to this date for 190 days clearing, grubbing, and preparing the equipment. Appendix B contains a listing of the Contractor Inspection Reports (CIR), Dredge Operation Reports (DOR), dates worked, and other essential dredging operation data.

51. The Jim Bean worked at the Theodore project during two different time periods: from 29 November 1979 through 17 April 1980 and from 3 January 1981 through the completion of the project on 28 August 1981. During excavation, the dredge would swing the cutterhead from side to side in a large sweeping motion controlled by winches which were connected to large side anchors embedded in the channel bottom. The elevation of the cutterhead was controlled by lowering or raising the ladder with large winches. The sandy materials would tend to flow toward the cutterhead, as the excavation proceeded; however, the stiff clays would form vertical faces as high as 10 to 20 ft. The initial height of the vertical clay faces which would form in front of the cutterhead would depend on the depth of cut and consistency of the material but the vertical clay faces would eventually slough off. Since a hydraulic dredge cannot make a slope cut, it was necessary to over cut the toe of the slope during each pass. When the vertical face sloughing of the material would occur, the soil would fill in the overcut and result in a sloped surface along the side of the channel. Illustrated in Figure 13 is the over-cutting construction technique used for a typical cross-section of Theodore ship channel. Side slopes of 1V to 2H were determined to be the steepest stable channel slopes which would remain without sloughing. Before the channel was cut to the final elevation of -42 ft mlw, the dredge had to make a maximum of three long parallel shallow cuts along the channel alignment.

52. Prior to the dredges moving into the turning basin, draglines working from the bank and from barges removed the landcut material down to about el -10 ft mlw. Upon entering the turning basin the dredges used the same procedure previously described to strip away the bottom material in 10- to 20-ft cuts down to el -42 ft mlw. When the Jim Bean returned to the project in January 1981, it worked in the turning basin and completed the work that the

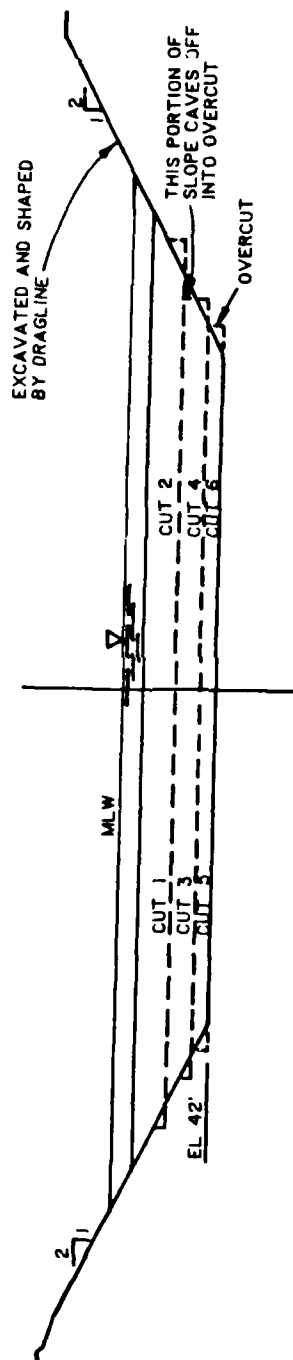


Figure 13. Typical hydraulic dredge channel excavation scheme

Dave Blackburn had not been able to complete. The Jim Bean started to dredge the soft channel materials at the mouth of the Theodore Ship Channel, where it meets with the Mobile Channel, but it was decided that it might be more cost-effective to bring in the Lenel Bean to complete the work.

53. A more complete description of the dredged material placement sequence along the dike alignment is tabulated in Table 1. In addition, Figures 14, 15, and 16 contain a graphical illustration of the dredged material placement sequence for the Jim Bean, Dave Blackburn, Lenel Bean and barge haul operations, respectively.

Dave Blackburn dredge

54. The Dave Blackburn dredge was moved to the Theodore Ship Channel project on 8 January 1980 and it worked continuously, except for minor breakdowns and maintenance repairs, until 28 July 1981. The Dave Blackburn started dredging sandy material at station 222+50 and proceeded toward the western shore before moving into the turning basin. Once the turning basin was completed, the Dave Blackburn moved back into the ship Channel and continued to dredge out areas where the best dike-building materials were located. The Dave Blackburn started dumping dredged material along the Gaillard Island dike alignment between stations 291+00 to 291+75 and then moved to the northernmost rim of Gaillard Island and continued depositing material in a southerly direction to station 203+00. A complete description of the placement sequence is outlined in Table 1 and graphically represented in Figure 15.

Hydraulic dredge-spill barge placement

55. Placement of the dredged material from the Jim Bean and Dave Blackburn dredges was controlled by personnel located on the disposal or spill barge. Material was placed at a minimum distance of 280 ft from the floating barge into three large mounds. One mound was located on the dike centerline with the other two mounds on each side of the centerline. The discharge was maintained from 3 to 8 ft above the water surface. Although there was some speculation as to whether the discharge should have been kept lower to reduce segregation and loss of fines, it was not believed significant. Once the centerline of the dike appeared to be from 2 to 3 ft above the water surface, the barge operator would winch the barge over approximately 100 ft to either side of the centerline and raise that portion of the dike. An energy dissipater was used on the end of the dredge pipe to reduce the formation of large holes in the dike fill; however, it was not completely successful. Discharge of

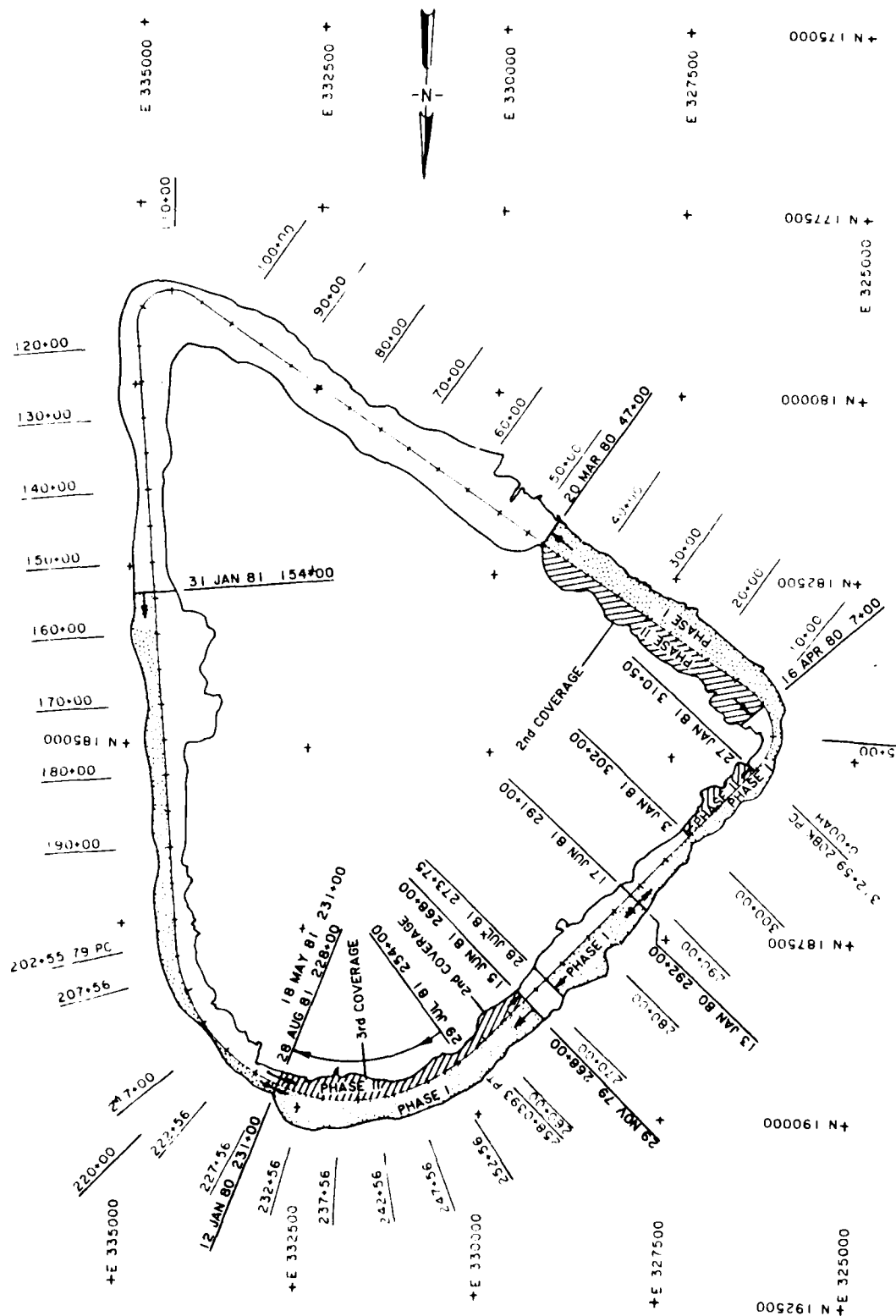
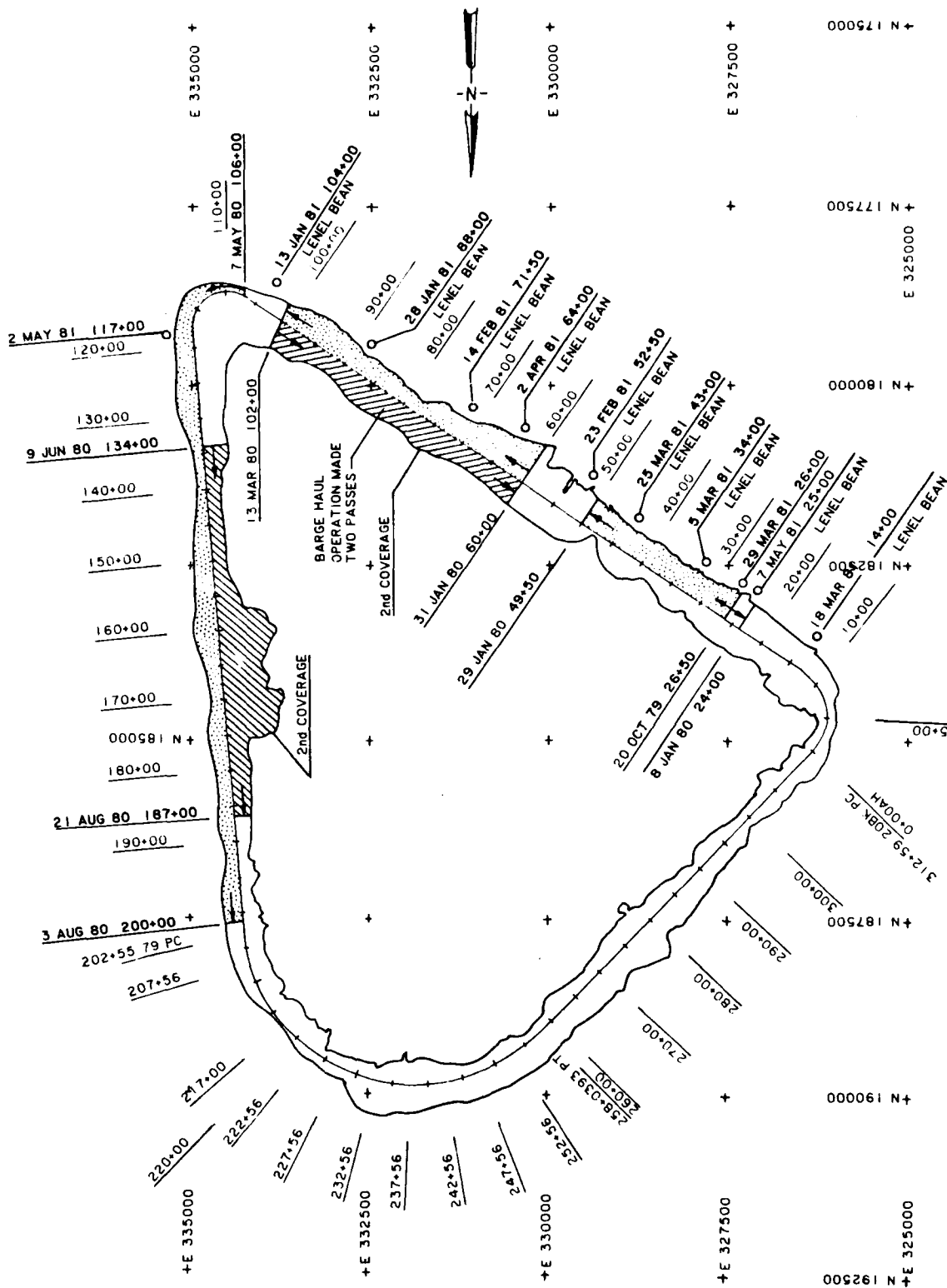


Figure 14. Dredged material placement sequence for Jim Bean Dredge



NOTE : O INDICATES LOCATION OF END OF LENEL BEAN DREDGE.

ARROW HEAD INDICATES DUMP DIRECTION OF BARGE HAUL OPERATION.

Figure 16. Dredged material placement sequence for Lenel Bean Dredge and barge haul operation

sandy materials would usually leave larger holes in the dike surface; whereas, material containing clay balls when discharged would stack up in large mounds with slopes of about 1V to 1H. When the required elevation was reached (about 2 to 3 ft above mlw), a person or low ground pressure equipment could work on the surface. However, if the bay bottom materials surfaced as a result of a mud wave, it would be several weeks before a crust would form strong enough to walk on.

56. During the first phase of construction, the spill barge was able to float along the centerline of the proposed dike alignment, but when subsequent fill was placed, the spill barge had to be positioned on the outside perimeter of the dike. The spill barge had difficulty getting close enough to the dike to place the material because of the shallow water depths over the extremely flat dike slopes of the initial dikes. Towboats were used to push the spill barge ashore during high tides and also to reposition them at new dump locations. To prevent any dredged material from running back into the bay, small diversion dikes were constructed which directed the dredge material back into the containment area.

Hydraulic dredge-spill barge problems

57. The construction of dikes using hydraulic dredged material in open water of a depth of 10 ft is highly dependent on the successful operation of the spill barge. The remote location of the discharge barge and lack of experienced operating personnel contributed to many of the problems that occurred, but overall supervision of the project was satisfactory. Proper placement of the dredged material for constructing dikes on soft foundation requires forceful preplanning, observation and supervision of the placement techniques. Many of the operational problems occurred on weekends and at night when the contractor's first-line supervisors were not available to make the proper decisions. The spill barge operator would sometimes deposit material all weekend in the same location without moving the discharge pipe causing mud displacement failures. These failures would not only displace the soft bay bottom materials to either side of the dike, but they would displace the material under and around the spill barge often requiring a tow-boat to pull the barge out of the mud. Once a shallow dike failure occurred, the soft bay bottom material would become entrapped and mixed with the fill material to such an extent that several weeks would be required before personnel could cross these areas. On one weekend the dredge pipe separated near station

207+00, which was about 500 to 600 ft from the spill barge with several thousand yards of dredged material being deposited before the discharge barge operator could get permission to make the necessary repairs. This incident cost the CE valuable time and several thousand yards of good fill suitable for use in the dike construction.

58. Survey control points were located by the contractor by using bamboo poles 30 ft long and 4 inches in diameter pushed into the soft bay mud. Quite often these poles would be accidentally knocked over by crew boats, towboats, barge traffic, heavy seas, or just simply float out of the mud. The bamboo poles needed holes drilled into the cellular compartments to reduce floatation. Three survey poles were located every 500 ft along the proposed dike alignment, with one pole on the centerline and the other two located about 250 ft to either side of the dike centerline. Small pen-lite flashlight bulbs and dry cell batteries were taped to the bamboo poles so the spill and haul barges could work at night. Once the embankment was constructed, the contractor's survey team was required to reestablish the three survey control poles on the dike and provide the CE with a profile of the constructed embankment both above and below the water surface.

Lenel Bean - Dust Pan Dredge

59. The Lenel Bean was brought to the project at the contractor's expense to determine if the very soft bay clays could be dredged more cost-effectively with a dust pan dredge than with a cutterhead dredge. There was considerable discussion as to how the contractor planned to operate the dust pan dredge before the Mobile District would allow the dredge to operate in the Mobile Bay. One of the major concerns was the high pressure water jets, which are used to stir the soft materials, might destroy the oyster beds downstream; therefore, it was agreed that the use of the water jets would be closely monitored. The dust pan dredge worked like an underwater elevator scraper loader that moved along the bottom scooping up soft material to a depth of one foot which was then sucked into the dust pan.

60. The required pumping distances for the dredged material varied from a minimum of about 1625 ft to a maximum of 3265 ft with an average distance of about 2100 ft. As the Lenel Bean advanced along the channel, the spill barge was moved along the south dike. Since the dredged material was very soft, it was not suitable for dike construction. Photographs in Appendix A show the placement of the dredged material. Even though the bay material was very

soft, the clay balls which were formed were dredged and pumped to the disposal area as shown in Figure A28. Small "row" dikes, as shown in Figure A27, had to be constructed along the crest of the existing dike to prevent soft dredged material from flowing back into Mobile Bay.

61. The locations for the end of the floating dredge pipe are shown in Figure 16. The floating pipeline was used between the Lenel Bean and the disposal island. A positioning barge was used along the shore of the disposal island to connect the floating pipeline with a section of shore pipe. The shore pipe was equipped with a valved wye which allowed material to be discharged at two alternate locations. All discharge locations were landward of the small "row" dikes.

Barge haul operation

62. The contractor elected to excavate a portion of the dredged material with land based and floating draglines. The material was loaded onto barges and ferried to Gaillard Island for off loading. Before the contractor could implement this excavation and hauling operation, an approved excavation and dumping plan was required by the Mobile District. Dredged material placement, location, width and depth of fill were agreed upon by both the contractor and the Mobile District before the operation began.

63. Description of draglines and associated equipment. Five different land based draglines were used at various times to excavate material from the land cut area in the ship channel and turning basin. During the conduct of this work no more than two draglines worked at any one time on the bank and only one floating bucket dredge was utilized. Draglines operating on the bank consisted of two Bucyrus Erie 88B, two Limas, and a Manitowoc 4600, each with a 6-cu yd bucket and 120-ft long boom. The floating bucket dredge had a 6-cu yd dragline clam bucket and 120-ft long boom and was mounted on a self-propelled spud barge. Shown in Figure A6 is a dragline on the bank of the turning basin loading a flat top steel deck barge. The deck barges were 40 ft wide and 140 ft long. The volume of dredged material contained in the barge was estimated by the displacement of the barge. After the barges were loaded, tow boats ferried the barges to Gaillard Island for off loading.

64. A special dragline and spud barge was used to unload the material. The special dragline consisted of a dozer blade, instead of a bucket, to scrape the material off. Special 4-ft long standoffs were welded to the spud barge so that when the dragline blade scraped the dredged material off the

barge it would fall between the haul barge and spud barge. As the dredged material was being unloaded from the haul barge, the tow boats remained with the barge to position it in front of the dragline to expedite unloading. The dragline was positioned on wooden mats so that it could move along the top of the spud barge to better distribute the dredged material on the bay bottom. Figure A7 shows a towboat positioning the haul barge alongside the spud barge. Shown in Figure A8 is a dragline reloading dredged material from a haul barge to construct the first phase of a perimeter dike. The barge haul-placement operation consisted of a spud barge, three or four towboats, a dragline, and at least twelve deck barges.

65. Barge haul construction sequence and placement technique. The construction sequence was to excavate dredged material from the turning basin and haul it to Gaillard Island and off load the dredged material to construct the perimeter dikes. Table 1 contains a listing of the excavation dates and dredged material placement stations on the various dredges. In the turning basin draglines positioned on the bank at el +22 ft mlw excavated material down to about el - 6 ft mlw; then a bucket dredge was used to excavate the material down to about el -10 ft mlw with the cutterhead dredges completing the excavation to el -42 ft mlw. Material excavated by the draglines and bucket dredge was hauled by deck barge to the dike alignment and placed in about 8 to 10 ft of water by the dragline mounted on the spud barge. Dredged material was placed along the dike alignment for 250 ft on either side of the centerline to an elevation no higher than -4 ft mlw. It was believed that 4 ft of water was sufficient to allow the spill barge from the cutterhead dredge to operate. Placement of sufficient material at the proper location was accomplished by moving the spud barge transverse to the longitudinal axis of the dike alignment. As the spud and haul barges would move across the dike alignment, dredged material would fall in the area between the very narrow barges to such an extent that the material would stack up above the water line and make it difficult for the spud barge to move. This procedure made it difficult to get an even distribution of dredged material over the area to be covered. In addition, trying to keep the spud barge on the dike alignment at night or during bad weather was difficult. Problems were complicated by not being able to identify the depth of previously placed dredged material and the loss of survey markers disturbed by the tow boats and barges. Because this

technique did not provide an even distribution of dredged material, a satisfactory estimation of fill placement could not be made.

Problems Encountered by Contractor

Introduction

66. Several problems plagued the contractor throughout construction of the Gaillard Island Dredged Material Disposal Area. Survey Control, establishment of vegetation on construction slopes, overland drainage structures, fuel price escalation, dredged material distribution, and weather conditions were some of the major problems encountered by the contractor.

Survey control

67. The project was not only very large, but it was located 2 to 3 miles offshore with the Theodore Ship Channel located parallel to the south leg of Gaillard Island. The original baseline established by the CE was destroyed during clearing operations and had to be reestablished. Restoration of the baseline was hampered by the continual changes in the channel alignment and other minor control problems during early phases of the contract.

Vegetation establishment on construction slopes

68. The contractor had a difficult time establishing vegetation along the land-cut channel slopes. On areas where sod was used the contractor was successful in maintaining the channel slopes, however, where seed was used even though it was fertilized and mulched was not very successful. The slopes of the channels consisted of very fine sandy silts and layers of clay that were highly erodible and low in nutrients. The contractor had to mulch and seed the slopes several times before he was able to establish a satisfactory vegetative cover. In addition, several deep rivulets were created by overbank flow. This occurred primarily in areas where the top of the bank did not have a berm to prevent overland flow.

Drainage structures in barge canal

69. A number of concrete drainage structures along the barge canal were partially destroyed because of excessive overland flow of water from the surrounding Theodore Industrial Park area. The side slopes of the barge canal were a problem to maintain because they contained layers of fine sandy silt and clays that were highly erodible. Many of these structures have been

redesigned and repaired before they would operate successfully. However, construction of the barge canal was not within the scope of this study.

Dredged material distribution

70. Open water disposal of hydraulically discharged fine-grained dredged material in moving water has always been a problem. Aerial photographs taken during construction indicated continual turbidity around and south of the Island. Local oyster fishermen were concerned that fine silt and clay-size particles would drift into the very productive oyster beds and destroy them. Therefore, the MDO conducted a study to determine the extent of the turbidity plume downstream from Gaillard Island.

Plume study

71. A "turbidity plume study" was conducted by Timothy Sullivan, of the MDO. The purpose of the study was to determine the thickness and aerial extent of a turbidity plume which could result from open water discharge of hydraulically dredged fine-grained materials. Lead line and sonar profiles were conducted near two channel stations: 120+00 and 130+00. These observations were conducted before (30 January 1981) and after (11 March 1981) the Lenel Bean had cut the channel to a depth of 27.5 msl and the full width of 400 ft. Lead line and sonar profiles were conducted from Gaillard Island south across Theodore Channel, a distance of over 2500 ft. These profiles were made prior to and after dredging had begun in the channel. Differences were observed between the sonar profile and lead line profile. Samples of the plume material were taken with a special sampling bucket. The wet densities were found to vary from 62.9 to 80.5 lb/ft³ with an average of 70 lb/ft³. The top surface of the sedimented dredged plume material was smooth; whereas, the lead line or original bay bottom was more irregular with sharp breaks caused by existing depressions and mounds. The depth of sedimented material diminished with distance away from the Island. Prior to work at channel stations 120+00 and 130+00, the layer of sedimented dredged material was an average of about 4 ft deep near the dike toe and less than 1 ft deep at a distance of 2500 ft south of the dike; however, material had accumulated in low areas near the dike toe as deep as 7 ft. After the Lenel Bean dredged the channel to a depth of 27.5 msl, sonar readings indicated that there was approximately an 8 to 9 ft of sedimented dredged material (70 pcf) covering the relatively uneven channel bottom. The material would not cause any navigational problems since the ships could easily pass through this soft "fluff", however, if the ship relied

upon sonar profile to determine the safe depth, then the ships would hesitate to enter the channel. This material lies very flat in the bottom of the ship channel and seems to cling to the channel side slopes in a blanket about 1 ft thick.

72. It was concluded from this investigation that the suspended clay-size particles were temporarily dispersed in the water south of Gaillard Island and would eventually flocculate out a distance of 3000 ft or less. The natural Bay bottom is very soft and exhibits the same properties, very soft surficial soil layers (70 pcf), in areas that have never been dredged. The Bay is shallow and after a storm, depending on the amount of fresh and salt water available, the Bay may stay murky over periods of months. It was also concluded from this study that a leadline survey is more accurate than a sonar survey and should be used as the basis for estimating pay.

Weather conditions

73. During the 828 days required to dredge the Theodore Channel, the contractor was forced to discontinue dredging operations for only about one half day on 12 September 1980 because of Hurricane Frederick. Weather conditions did not change the hydraulic dredging activities, except for minor thunderstorms, high seas, and fog that occasionally prevented shift changes, repairs, and dredge pipeline work. Weather prevented the barge haul operation from hauling dredged material on several occasions because of poor visibility and high seas. On occasions weather conditions prevented the contractor survey teams from replacing the dike channel survey control markers. Neither weather conditions (except Hurricane Frederick), tidal fluctuations, nor current conditions in Mobile Bay prevented the contractor from dredging during the contract period.

Fuel escalation cost

74. The dredging operations consume vast quantities of diesel fuel. An important consideration in the dredging costs for a project of this size is possible escalation of fuel price within the contract duration. The contract used for this project did not have a fuel price escalation clause and thus was not modified even though fuel cost increased from \$0.38 per gallon in March 1979 (when the contract was awarded) to over \$1.00 per gallon (at the completion of the contract). Fuel costs rose by more than \$0.50 per gallon during the first year and then remained between \$0.95 to \$1.00 per gallon for the rest of the contract period.

75. In an attempt to minimize fuel costs, the contractor tried to purchase and store large quantities of fuel; however, storage became a problem. Implementation of the barge haul operation in the land-cut and the innovative ideal of utilizing a dust pan dredge to remove the soft bay materials helped to minimize contractors costs.

PART VI: ASSESSMENT AND CORRELATION OF SOIL DREDGING DATA FOR DISPOSAL DIKE

Introduction

76. After the 6 mile long perimeter dike was constructed for Gail-lard Island the immediate concern centered upon the resistance of the dike to the forces of nature. Initially, there was some concern as to whether the dike could be constructed using the fine-grain dredged materials available from the channel. Once the dike was constructed the primary concerns were with settlement of the dike and erosion or scour around the dike toe. Immediately after dike construction survey profiles and soil borings were made to correlate embankment slopes and soil characteristics. Permanent bench marks and piezometers were installed to monitor the long-term behavior of the embankment.

Dike Cross-Section and Contour Maps

77. Survey profiles and cross-sectional data were taken by the dredging contractor immediately after dike construction for the first and second phases. The location of the dike cross-sections contained in Appendix D, are shown in Figure 17. Dike surface contour maps were developed from aerial photographs by the MDO and are shown in Appendix E. The aerial photographs were not shown in this report. The cross-sections shown in Appendix D included only the final survey for the second phase of construction. To aid in correlating the underlying soil data to the dike profiles boring logs have been plotted on the cross-sections shown in Appendix D, and matched the closest station to where the boring was made. The soil borings are located in Figure 18. An attempt was made to locate the original bay bottom and any dike displacement from the boring log data. The dotted or dashed line shown on each Figure in Appendix D was based on a bay bottom contour map prepared by USGS (1976). During post construction, the Mobile District made ground surface reconnaissance surveys in 1981 of the surface soils. The results of the these surveys are shown in Figure 19.

CORPS OF ENGINEERS

192500 N

190000 N

187500 N

E 336000 +

CURVE NO 3
 $\Delta = 131^{\circ} 50' 56''$
 $R = 2408.54$
 $T = 5407.41$
 $LC = 4400.32$
 $ARC = 5348.14$

E 332500 +

E 330000 +

E 327500 +

E 325000 +

192500 N

190000 N

187500 N

185000 N

220.00

222.56

227.56

232.56

237.56

242.56

247.56

252.56

258.0193 P.T.

260.00

265.00

270.00

275.00

280.00

285.00

290.00

295.00

300.00

305.00

312.59 20.84 PC
 0.00 24.44

9.22

207.56

202.55 15 PL

195.00

190.00

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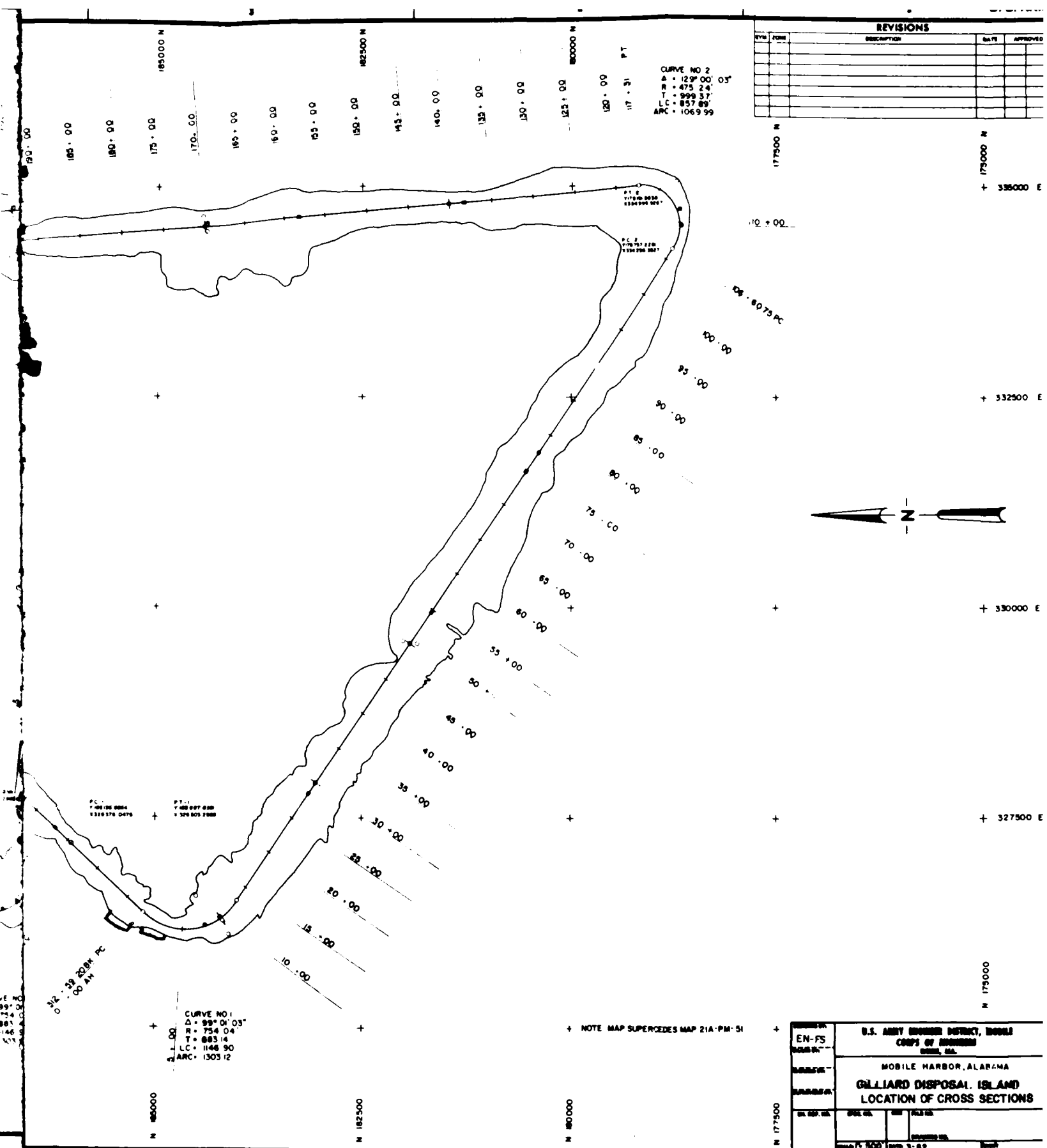
175.00

NATH LINE

1.25 1.25
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1.25 1.25
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50



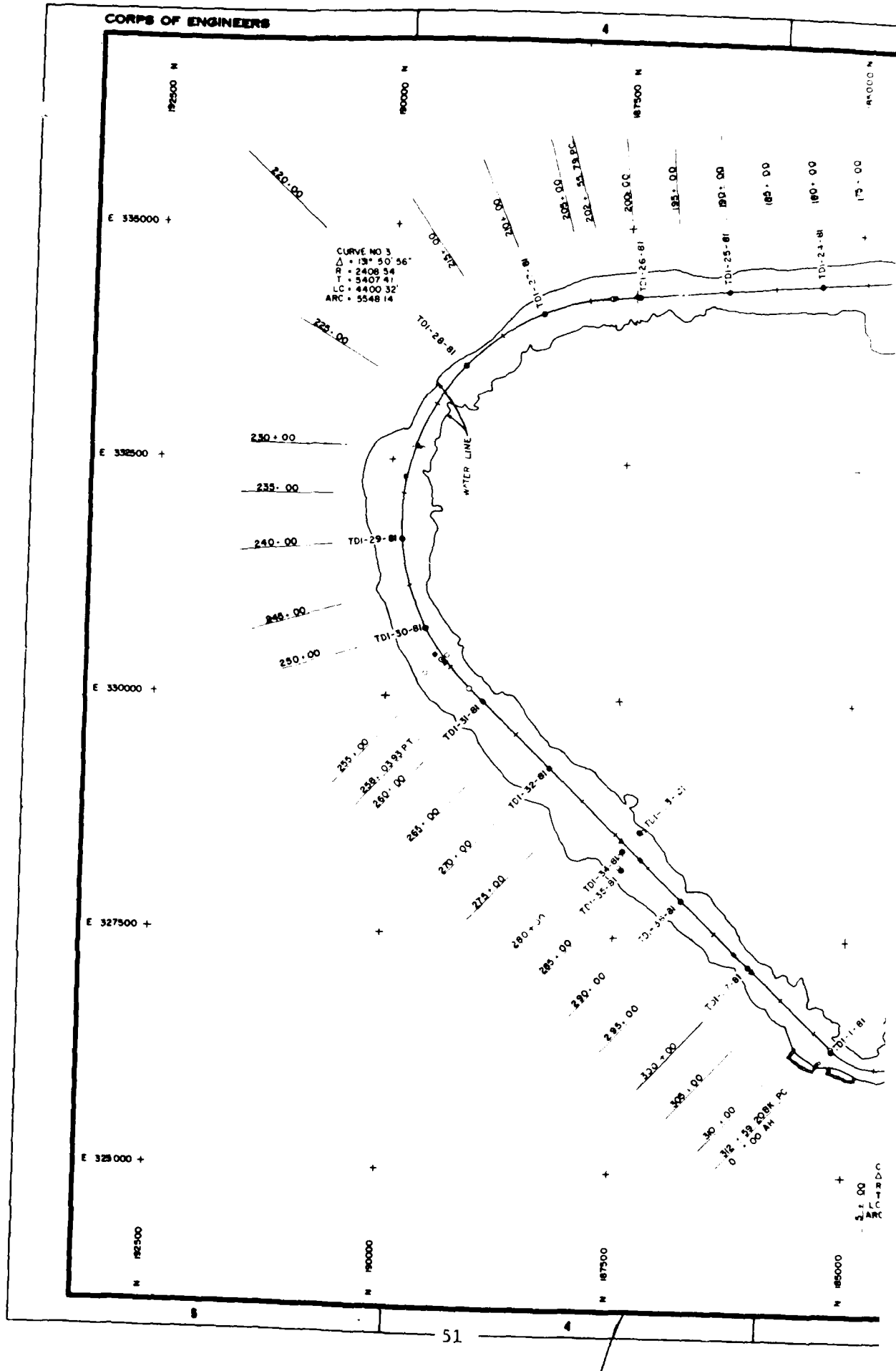
REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED

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 R = 475.24'
 T = 999.37'
 LC = 857.89'
 ARC = 1069.99'

CURVE NO. 1
 Δ = 99° 04' 03"
 R = 754.04'
 T = 883.14'
 LC = 1146.90'
 ARC = 1303.12'

EN-FS		U.S. ARMY ENGINEER DISTRICT, MOBILE	
MOBILE		CORPS OF ENGINEERS	
MOBILE		MOBILE HARBOR, ALABAMA	
MOBILE		GILLIARD DISPOSAL ISLAND	
MOBILE		LOCATION OF CROSS SECTIONS	
DATE	BY	DATE	BY

CORPS OF ENGINEERS



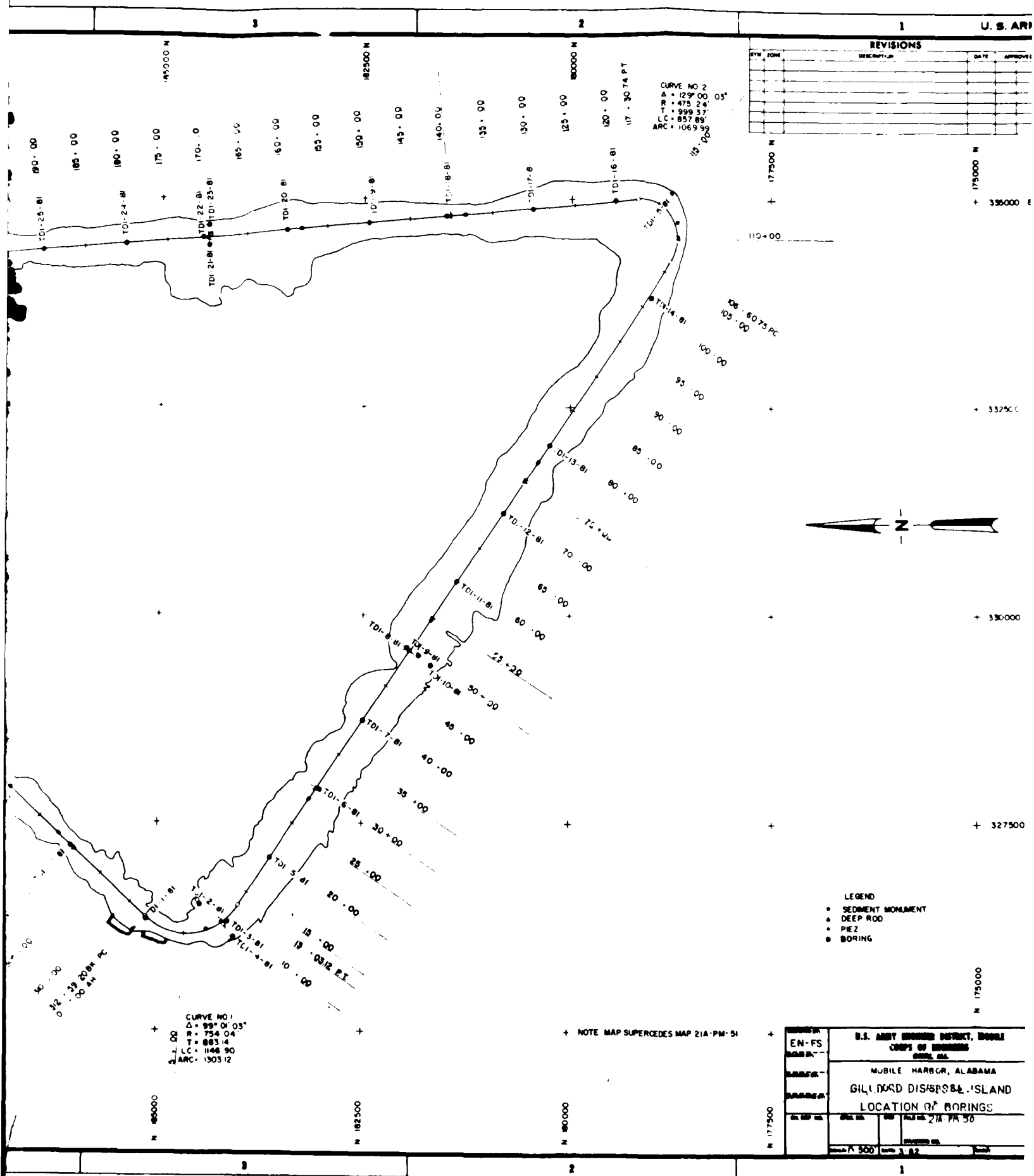
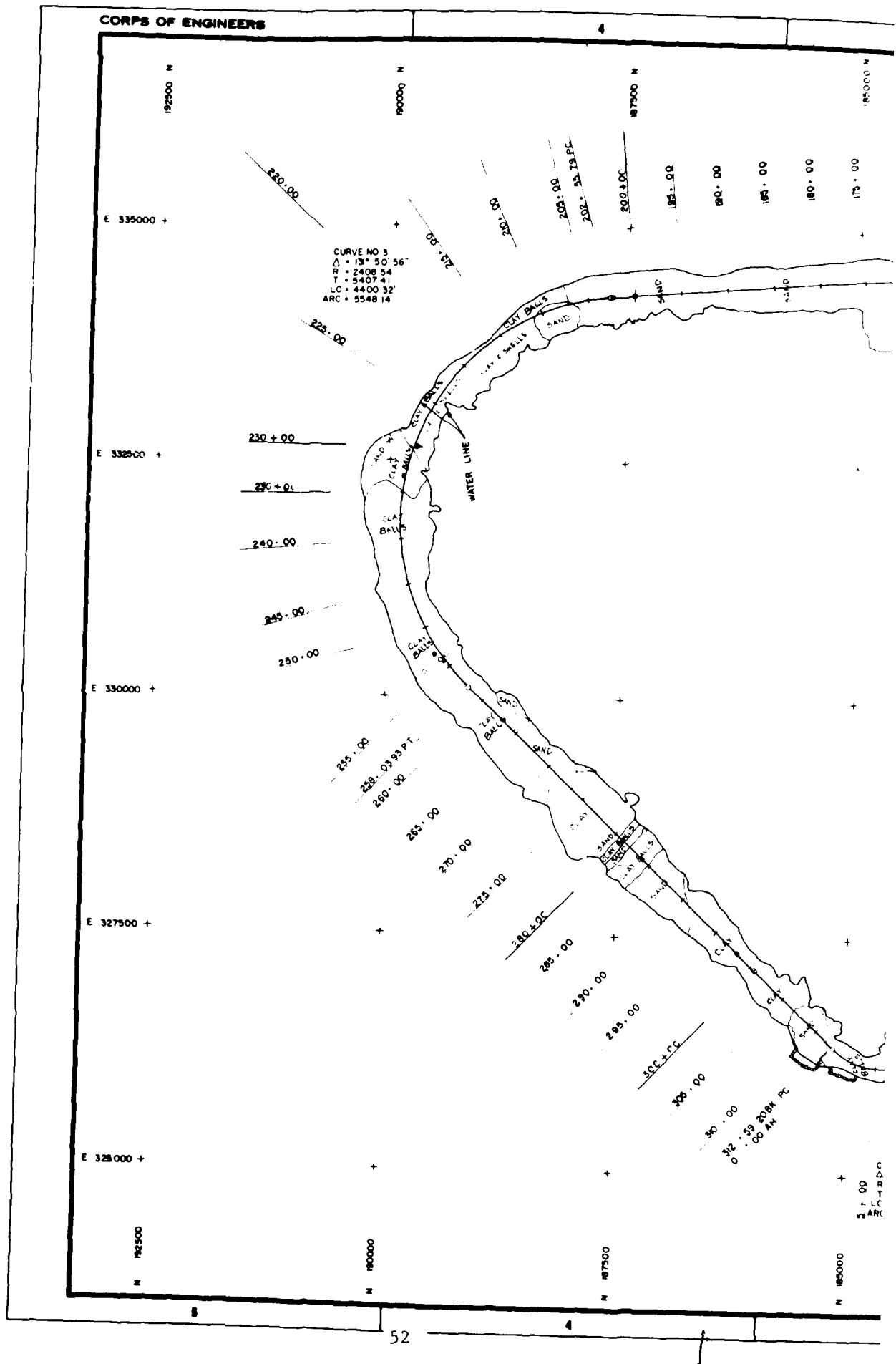


Figure 18

CORPS OF ENGINEERS



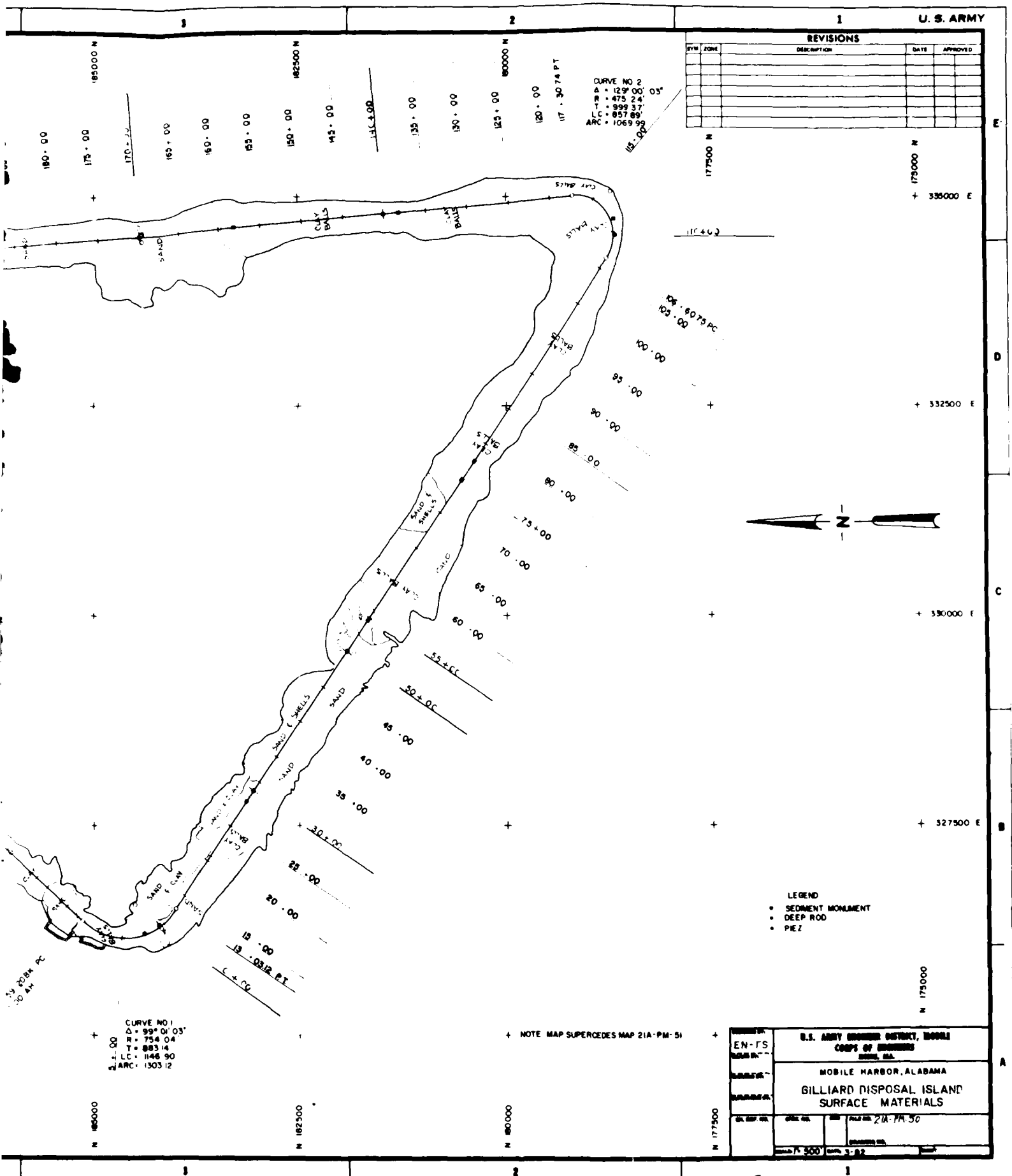


Figure 19

Embankment Slopes After Barge Haul and Hydraulic Dredged Material Placement

78. After different phases of the barge haul operation were completed an attempt was made to determine depth and slope of the fill. Since the fill was to be placed only to -4 ft mlw it was very difficult to conduct a sonar profile; therefore, it was necessary to locate the surface of the fill with a survey rod. It was found that the fill did not have a smooth surface, rather it was very hummocky and rough. The slopes were very steep immediately after placement with some locations approaching a 1V:1H slope. Since all of the barge haul material came from the land-cut portion of the Theodore Ship Channel, the stiff consistency of the clay material was assumed to contribute to the steep slopes and hummocky surface of the submerged fill. In some places, the material placed by the barge haul operation was above the water surface.

79. Once the dredging contractor had completed the dike system for Gaillard Island, he was required to provide the Mobile District with cross-section of the dike at select locations. These cross-sections are contained in Appendix D. After the Contractor was finished the Mobile District made soil borings through the completed dike. A log of these borings is shown at the appropriate dike locations in Appendix D. The slopes, depths of fill, and predominant fill material for the dikes are tabulated in Table 2. The elevations of the original bay bottom before and after construction are also tabulated in Table 2.

80. The fill material varied from a clean sand to clay balls with a sand, silt, and shell matrix. Slopes above the water surface were usually steeper, depending on the type of fill, than the slopes below the water surface. Slopes made of sand generally were flat with slopes varying from 1V:1H. Figure A16 is a photograph which shows a 1V:1H slope constructed from clay balls.

81. Below the water surface, dike slopes constructed primarily of sand averaged about 1V:61H on the inside and 1V:53H on the outside. Some slopes constructed from fine sands, silts and soft clays were as flat as 1V:250H. The slopes constructed from clay balls were steeper with slopes averaging about 1V:32H on the inside and 1V:45H on the outside. The steeper clay ball slopes experienced more erosion than the flatter sandy slopes. The erosion generally consisted of the creation of small vertical scarps which eroded

quite rapidly. Figure A17 is a photograph showing these small vertical scarps.

82. The original bay bottom varied from about el -8.0 to el -12.0 ft mlw with an average of el -9.0 ft mlw prior to construction. As a result of construction, the bay bottom soils were displaced both laterally and vertically. In some areas mixing of the displaced bottom soils and dike fill material occurred. After construction the surface elevation of the original bay bottom materials varied from about -5 ft to -21 ft mlw which indicates an upward movement of bottom materials by about 4 ft in some locations and a downward movement of about 12 ft in other locations.

Dredged Material Volume Removed from Theodore Ship Channel

83. Dredged material was removed from Theodore Ship Channel by both barge haul and hydraulic dredging operations. The daily records for the dredging operations are tabulated in Appendix B. Bar graphs designed to illustrate the volume of dredged material removed from the landcut and baycut portions of the ship channel are shown in Figures 20 through 23. Each bar on the graph represents a horizontal distance of 500 ft along the channel while the vertical height represents the total volume removed from that particular reach. Volumes of sand, silt, clay or shell dredged in each reach are shown as segments of the bar. Unfortunately the bar segments are not identified as to which segment represents what type of material. Further modification of the program would be required to identify and illustrate the individual soil types on these plots.

84. A bar graph of the dredged material cut volumes made by the barge haul operation for the land-cut portion of the ship channel is shown in Figure 20 and the bay-cut portion is shown in Figure 21. It can be seen in this illustration that the barge haul operation was utilized primarily for excavating dredged material from the turning basin. Excavation along other portions of the landcut and baycut made by the barge haul operation was primarily for the purpose of shaping the side slopes and smoothing out high ground along the bottom of the ship channel.

85. Dredged material cut by the hydraulic dredging operation are shown in a bar graph plot in Figure 22 for the landcut portion of the ship channel and Figure 23 for the baycut portion. These plots represent dredged material

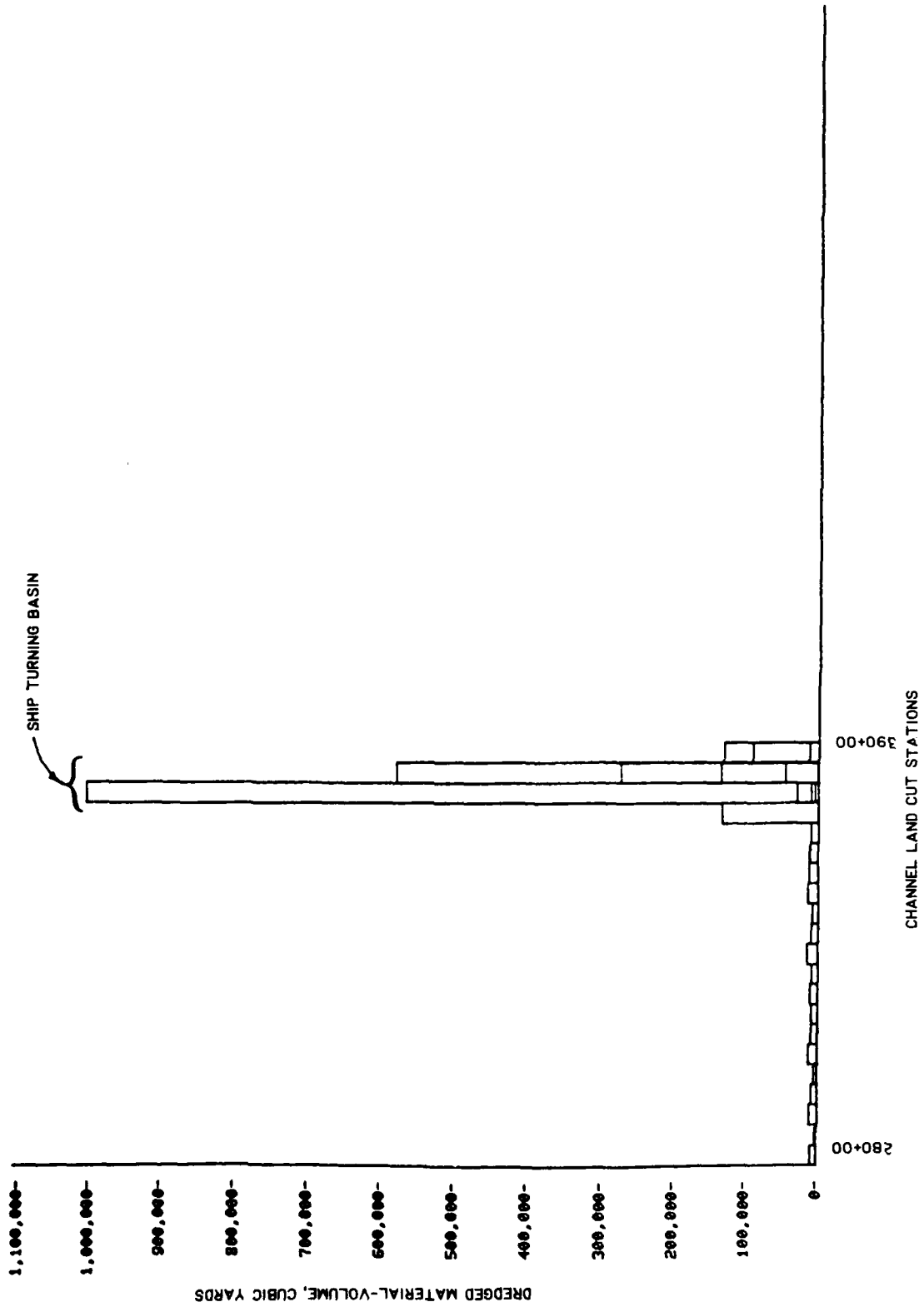


Figure 20. Dredged material volume, cu yd, versus channel land cut stations, bargehaul operations

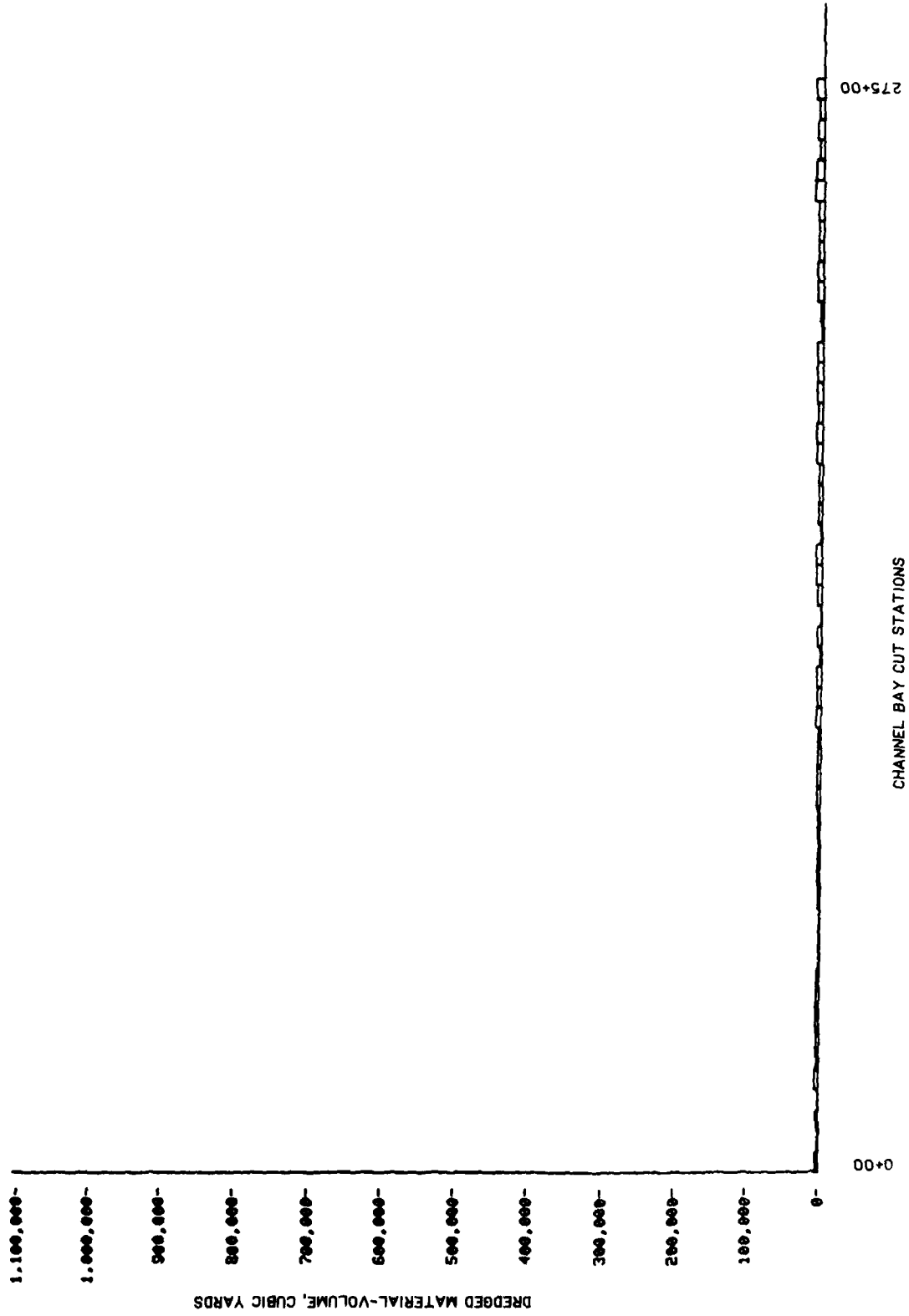


Figure 21. Dredged material volume, cu yd, versus channel bay cut stations, bargehaul operations

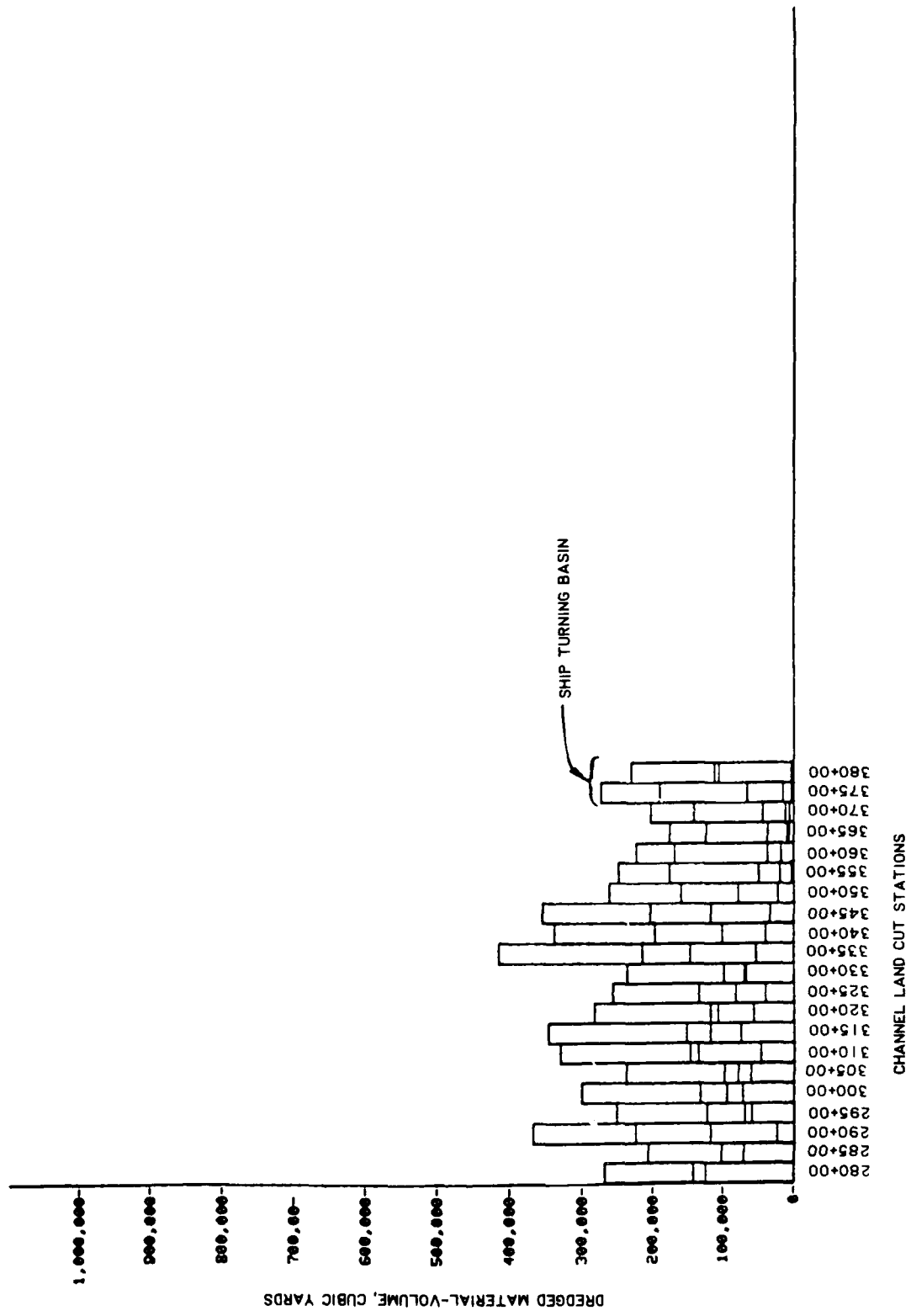


Figure 22. Dredged material volume, cu yd, versus channel land cut stations, hydraulic dredging

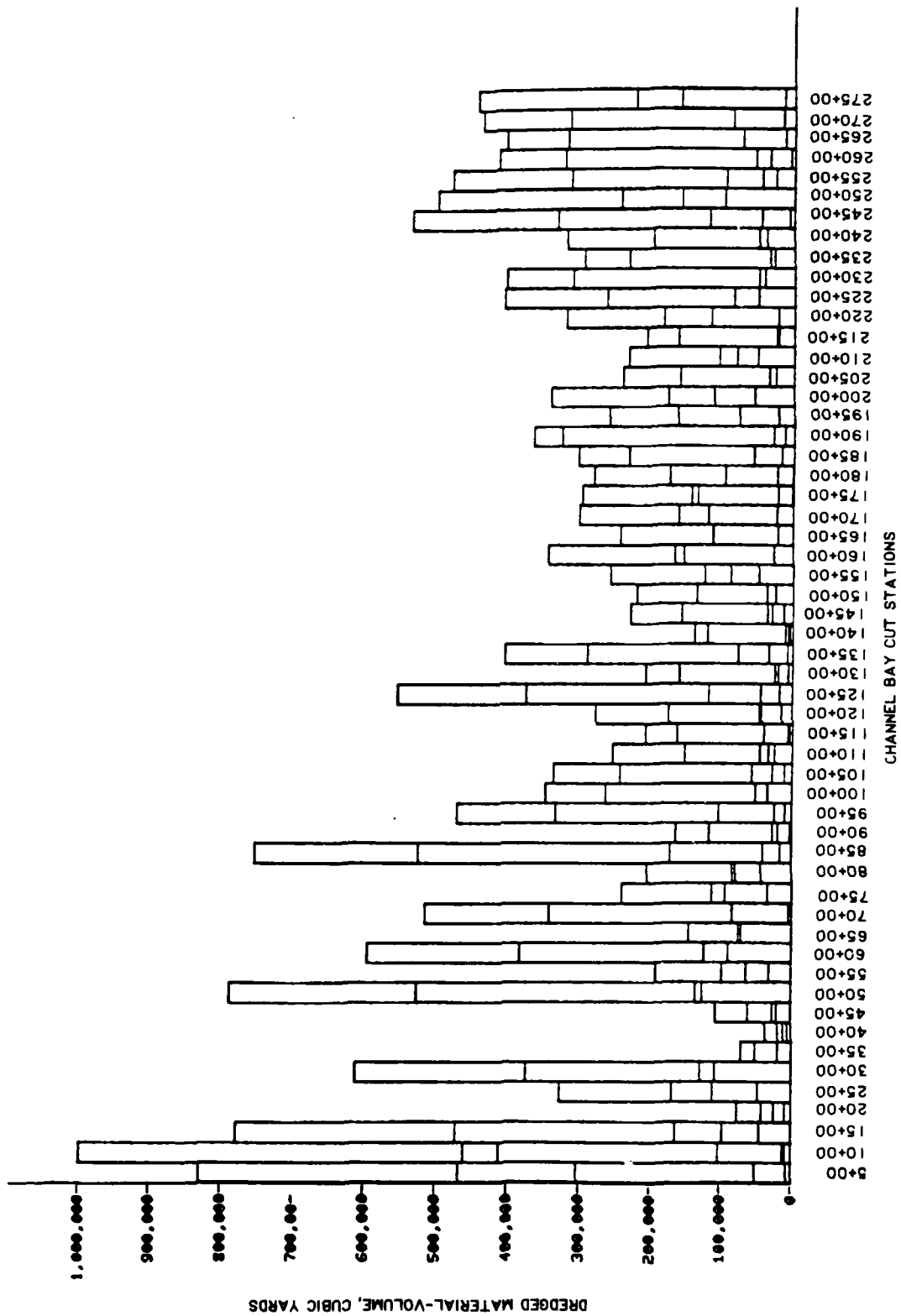


Figure 23. Dredged material volume, cu yd, versus channel bay cut stations, hydraulic dredging

volumes dredged by all three dredges (Jim Bean, Dave Blackburn and Lenel Bean). These plots indicate the distribution of cut volumes recorded along the ship channel alignment is not evenly distributed. The large increase in the bar graph volumes near the Mobile Ship Channel is a reflection of the side cast dredging over the years that has left a low ridge of dredged material adjacent to and parallel to the Mobile Ship Channel. The low volume indicated near station 45+00 was caused by dredged material excavated from this location in an earlier experiment for a trial test section that was discussed earlier in this report. Other low and high volumes reflected in this bar graph could have been caused by previous oyster shell mining by local shell suppliers. There seems to be a more even distribution of dredged material cut volumes (Figures 22 and 23) nearer to the landcut and in the landcut areas of the ship channel.

86. Total dredged material volumes cut by both the barge haul and the hydraulic dredge operation from Theodore Ship Channel are shown tabulated in Table 4. A total of 27,956,126 cubic yard of dredged material was reported removed by the contractor's daily reports from both the landcut and baycut portions of the Theodore Ship Channel. The predicted volume was calculated to be about 31,105,000 cubic yards. This figure was used in the contract advertisement. The predicted baycut dredged material volumes and the cut volumes reported by the contractor's daily reports were almost identical but there was about a 2 million cubic yard difference between the predicted volumes and the volumes reported by the contractor for the landcut. This loss of material may be attributed to a number of factors such as inadequate surveys and/or accumulative mathematical errors or accumulative survey errors in the volume calculations reported in the daily record. A 10 percent loss of volume for the landcut portion of the ship channel is not as easy to justify as would be an equivalent loss in the baycut; therefore, there must be an error either in the calculations or the dredged material volumes reported by the different dredging operations.

PART VII: DREDGED MATERIAL VOLUMES DETERMINED IN GAILLARD ISLAND DIKE AND CONTAINMENT AREA

87. Determination of dredged material volumes placed in the dike sections and containment area at Gaillard Island was made from Dredge Operation Reports for each of the dredging operations. The volumes as reported were compared with these calculated from survey cross-sections and boring log data. Total volumes of dredged material determined for the south, east, and west legs of the island for barge haul and hydraulic dredging are shown in Figures 24 through 28. Each one bar in these Figures represents a 500-ft segment of dike length. Even though the dredged material was reported and plotted in segments of sand, silt, and clay, etc., these values were not identified in the plots.

88. Shown in Figures 24 and 25 is volume of dredged material deposited by the barge haul operation along the south and east dike alignment. There was no fill placed along the west dike alignment by the barge haul operation. The barge haul operation was responsible for placing 2,260,325 cubic yards of dredged material along the south and east dike alignment. The dredged material fill volumes for the south, east, and west legs of the island are shown in Figures 26 and 27 for the hydraulic dredges. The dump locations along the south and east sides of the island for the Lenel Bean can be easily identified by the sharp rises in the bar in these Figures.

89. The total volume of dredged material taken from the channel and placed in each of three legs of the dike and in the containment area was determined from the hydraulic dredging records. A listing of the dredged material volumes for the bay-cut, land-cut, and fill volumes for each leg and the containment area for each dredging operation, along with the soil types, material dumped in the containment area from the Lenel Bean consisted of about 75 percent fine-grain soils and 25 percent shell with practically no sand.

90. The total volume of hydraulic and barge haul fill for each leg of the island was determined to be about 10.2, 5.5, and 7.0 million cubic yards for the south, east, and west leg, respectively. It was also determined that about 5.3 million cubic yards, or about 19 percent of the total volume excavated and placed, was stored within the confines of Gaillard Island. Therefore, about 350 acres of dredged material in the southeastern corner of the containment area was exposed above mls.

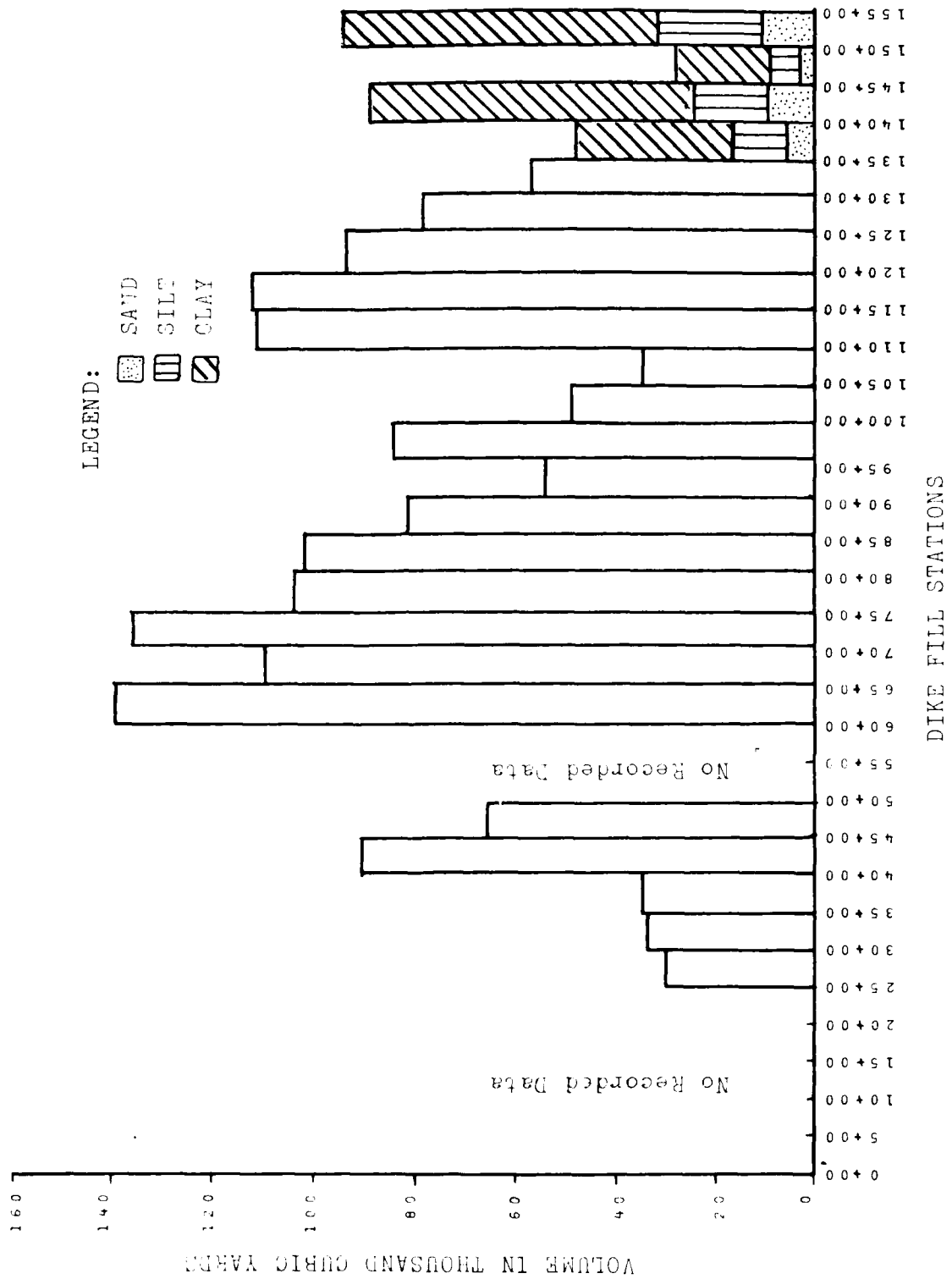


Figure 24. Recorded volumes of barge hauled dredged material in dike fill (Stations 0+00 thru 155+00)

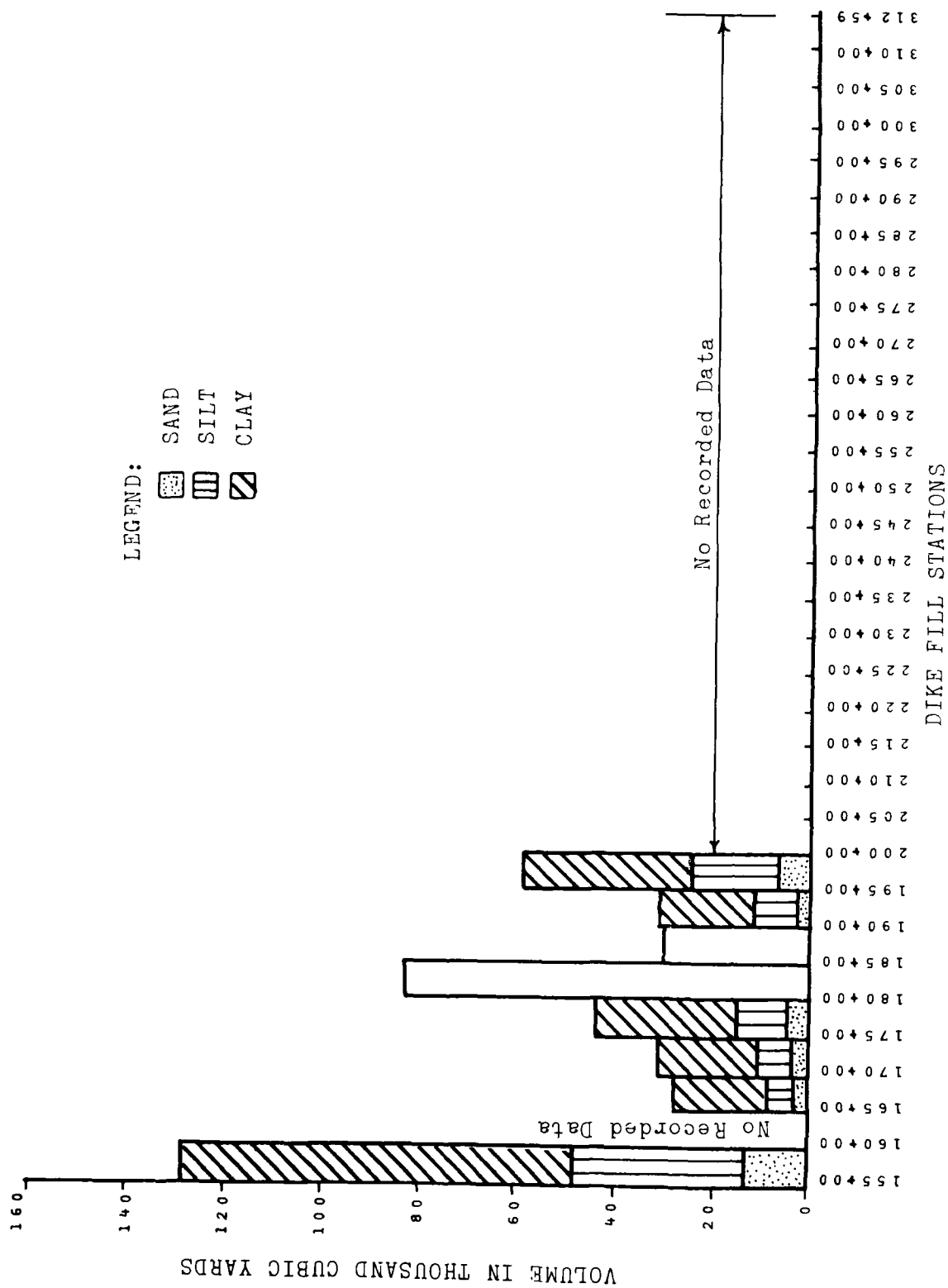


Figure 25. Recorded volumes of barge hauled dredged material in dike fill (Stations 155+00 thru 312+59)

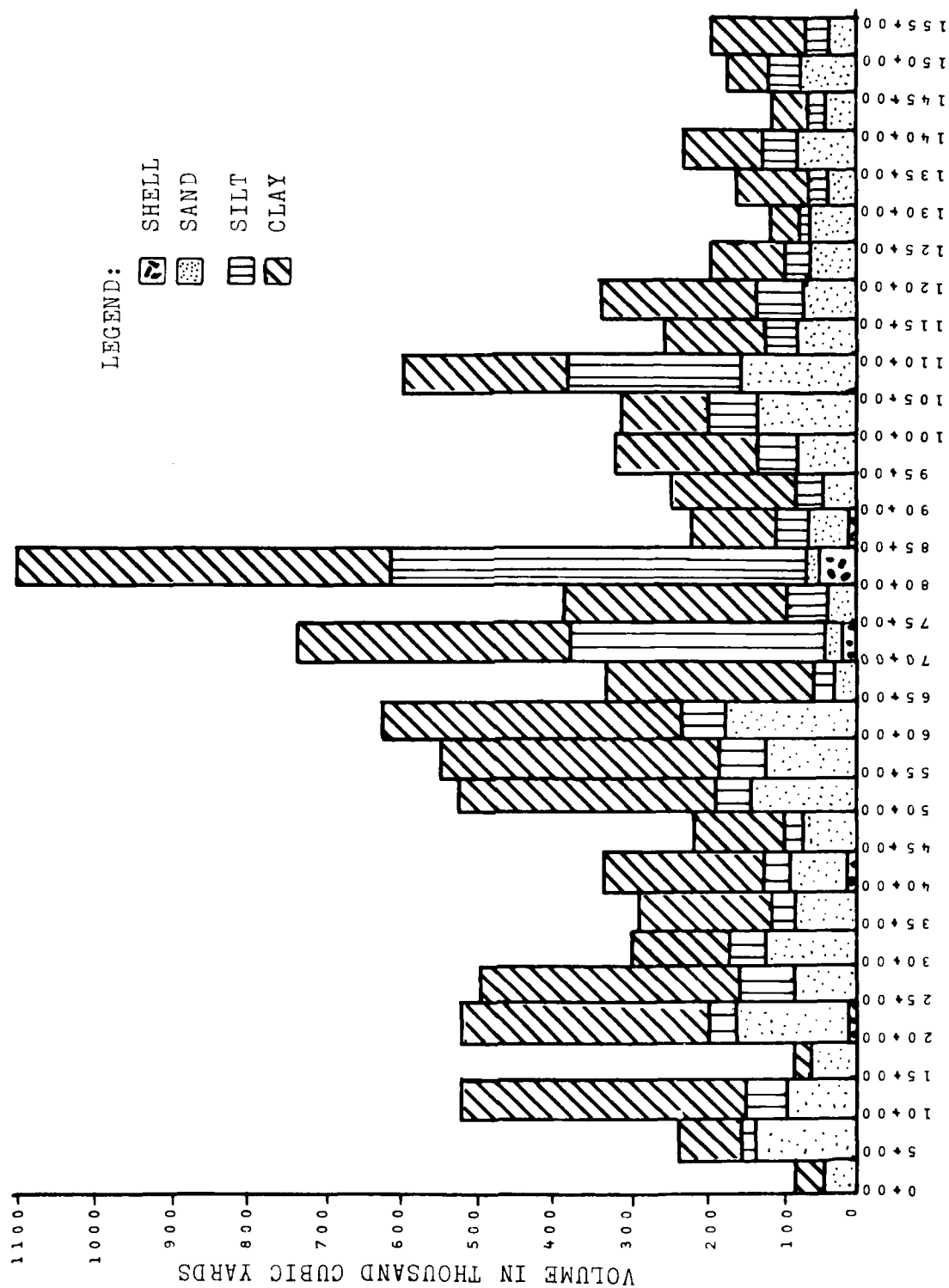


Figure 26. Recorded volumes of hydraulically placed dredged material in dike fill (Stations 0+00 thru 155+00)

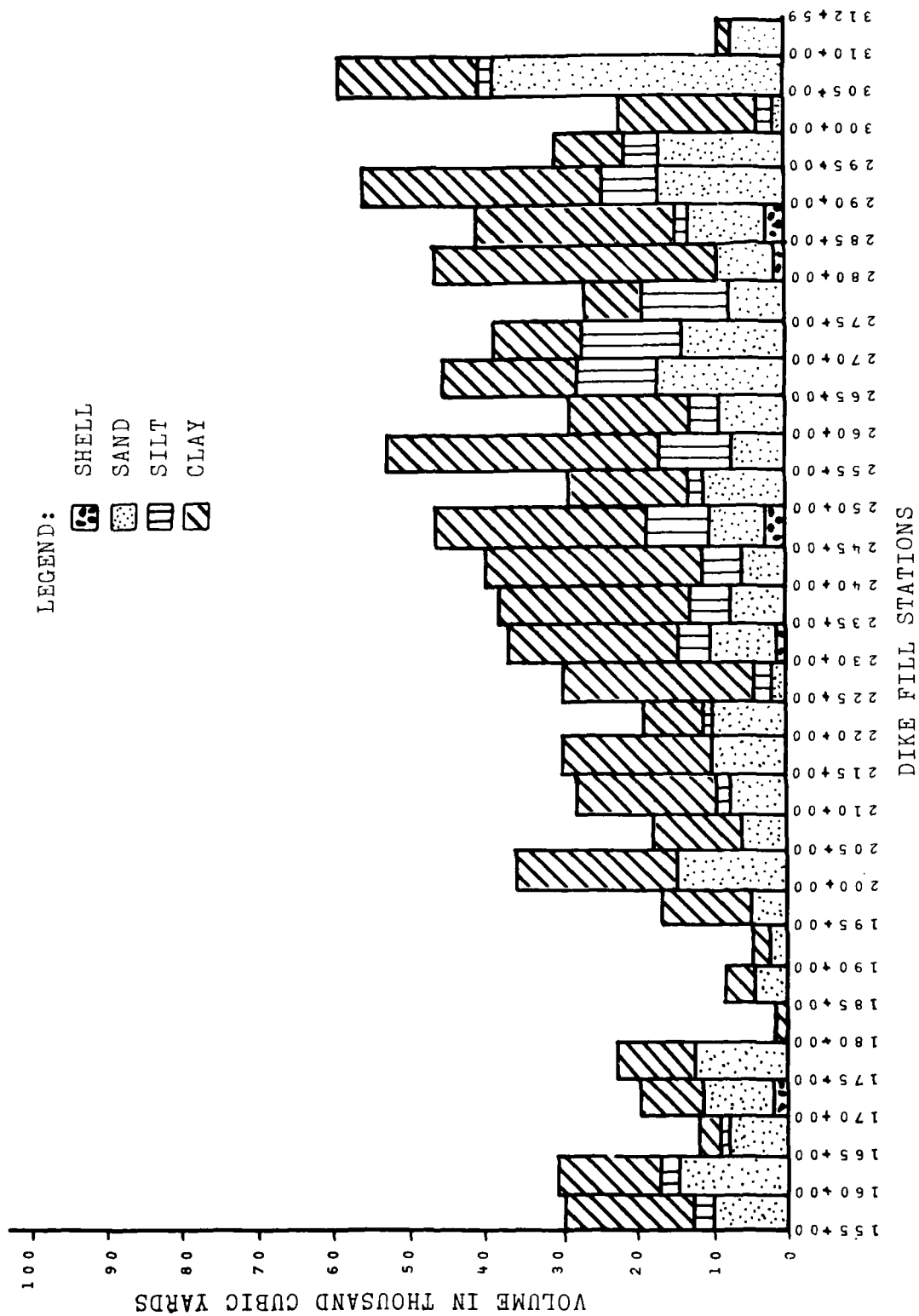


Figure 27. Recorded volumes of hydraulically placed dredged material in dike fill (Stations 155+00 thru 312+59)

Retention of Dredged Material in the Dike and Containment Area

91. After construction, it was determined from the dike elevation contour maps that approximately 320 acres of surface area was exposed above mlw; thus providing a containment area of about 1300 acres for future dredged material storage. About 350 acres of dredged material in the southeastern corner of the containment area is exposed above mlw. It was estimated from the final dike cross-section end areas that approximately 17.4 million cubic yards of dredged material was located within the perimeter dike and about 10.8 million cubic yards was estimated to be contained within the containment area, for a total dredged material volume of 28.2 million cubic yards. These volumes could be misleading since volumes after placement are often different than in situ volumes. If it is assumed a volume change of 1.3, then the actual material cut from the channel would be 13.4 million cubic yards; if a volume change of 1.5 actual occurred, then the actual volume cut from the channel would be only 7.2 million cubic yards.

92. The Lenel Bean dredge excavated about 5.3 million cubic yards of material that was dumped directly into the containment area; therefore, it is assumed that the remaining 1.9 million cubic yards resulted from spillover from perimeter dike construction. The total amount of channel cut material estimated (from island cross-section) to construct the perimeter dike and estimated to be inside the containment area was about 20.6 million cubic yards. The total gross measured volume of channel cut dredged material determined from the Channel survey cross-sections was about 33.5 million cubic yards.

93. The retention rate is calculated by dividing the volume of dredged material estimated from cross section of the dike fill and containment area, 20.6 million cubic yards, by the total volume of material cut from the channel, 33.5 million cubic yards shown tabulated in Table 4. Therefore the retention rate was determined to be about 61 percent which means about 39 percent of the channel cut material was unaccounted for after construction. A difference of 39 percent is relatively low considering the large volumes of clays and silts present in the channel and soft foundation soils of the containment Island. If the total dredged material volume reported by the contractor's daily records, 28 million cubic yards, was used to determine the retention rate then the retention rate increases to 74 percent and the amount

of material unaccounted for is only 26 percent.

94. It is believed that the soils lost during construction were the fine silts and clays which were carried away in suspension by the bay currents. Based on studies performed by the Mobile District, these materials would not have travelled more than about 2500 ft to 3000 ft from the outer boundary of the island before being precipitated by the sea water. Some of the dredged material may have traveled down the Mobile Ship Channel; however, there were no appreciable changes in the navigation depths.

95. Dredged material volumes estimated by the government prior to construction, volumes reported by the contractor from dredging records, actual volumes paid for, and the gross volumes estimated from cross sections are tabulated in Table 4. The government's final estimate for the channel cut, differed from the Contractor's estimate by about 0.6% based on final cross-sections. The gross over cut volume was about 7 percent above the pay volumes. The volumes reported in the Contractor's daily records were about 16 percent less than the gross volumes, and about 11 percent less than the pay volumes. Government estimates of bay-cut volumes and that reported and surveyed and paid for were in very close agreement; whereas the gross overcut volumes in the bay-cut were about 8 to 9 percent more than these values. Volumes estimated by the government in the land-cut agreed fairly well with the yardage paid the contractor and the yardages measured from the cross-sections; however, the volumes reported in the Contractor's daily records indicated a volume of about 26 to 29 percent less. This large difference is partly attributed to an 0.8 million cubic yards difference between barge haul volumes reported by the contractor and the yardage paid by the government.

96. A breakdown of the volumes dredged for each dredging operation for both the bay-cut and land-cut is also shown in Table 4 along with the dredging cost. The volumes for each dredging operation shown in the column for Yardage Paid the Contractor in Table 4 were adjusted by the MDO according to the daily records. Bay-cut excavation cost were \$0.88 per cubic yard and land-cut cost were \$2.216 per cubic yard. Total dredging cost for 31,293,786 cubic yards of material was \$42,844,732.77.

Geotechnical Investigation

Field and laboratory tests

97. The subsurface investigation conducted by the Mobile District drill crew personnel consisted of making standard penetration tests and obtaining 3-inch diameter undisturbed Shelby tube samples. The results of these tests are shown on the survey cross-sections in Appendix D. The locations of the borings are shown in Figure 17. Thirty seven boring logs have been plotted on the dike cross-sections shown in Appendix D at the stations closest to the actual boring locations. Twenty-nine of the soil borings were located on the longitudinal dike centerline and 8 were offset on either side of the dike centerline. During the drilling operations, an attempt was made to establish the elevation of the original bay bottom. Drilling and sample collection were very difficult because all Standard Penetration tests and Shelby-tube sampling was conducted using a portable tripod. Site mobility along the dike centerline was also hampered because of soft surface conditions. Field and laboratory soil classifications, water contents, Atterberg limits, and gradations were conducted on the disturbed samples obtained from the Standard Penetration tests. Q and \bar{R} triaxial shear strength tests were conducted on undisturbed soil samples taken from the Shelby tubes. The results of the triaxial tests are shown in Figures 28 through 33. The triaxial samples were taken primarily from potentially weak foundation areas that contained clayey (CH) soils. The locations of these weak foundation areas were determined from Standard Penetration tests. The results from the Q tests indicated shear strengths in the range of 0.05 to 0.06 tsf with an undrained internal friction angle, ϕ , of 0 deg. The \bar{R} tests indicated an undrained cohesion that ranged from 0.0 to 0.20 tsf and an undrained friction angle that varied from 10 to 14.5 deg. The effective \bar{R} cohesion varied from 0 to 0.10 tsf, with an effective internal friction angle, that varied from 20.5 to 24 deg.

98. Field vane shear strength tests were conducted at select locations along the dike alignment by using a 2.5-in. wide by 4.5-in. long vane with a 0.75-in. taper. Table 5 contains a tabulation of boring numbers, locations, elevation, and corrected shear strength determinations for each vane shear test. The in situ vane shear strength varied from 0.03 to 0.39 tsf in the soft dike and foundation soils. The vane shear tests were conducted in areas that were considered to be soft and weak, i.e., potential failure zones.

WORK ORDER NO. 2952
REQ. NO. 95-81-F & M

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CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

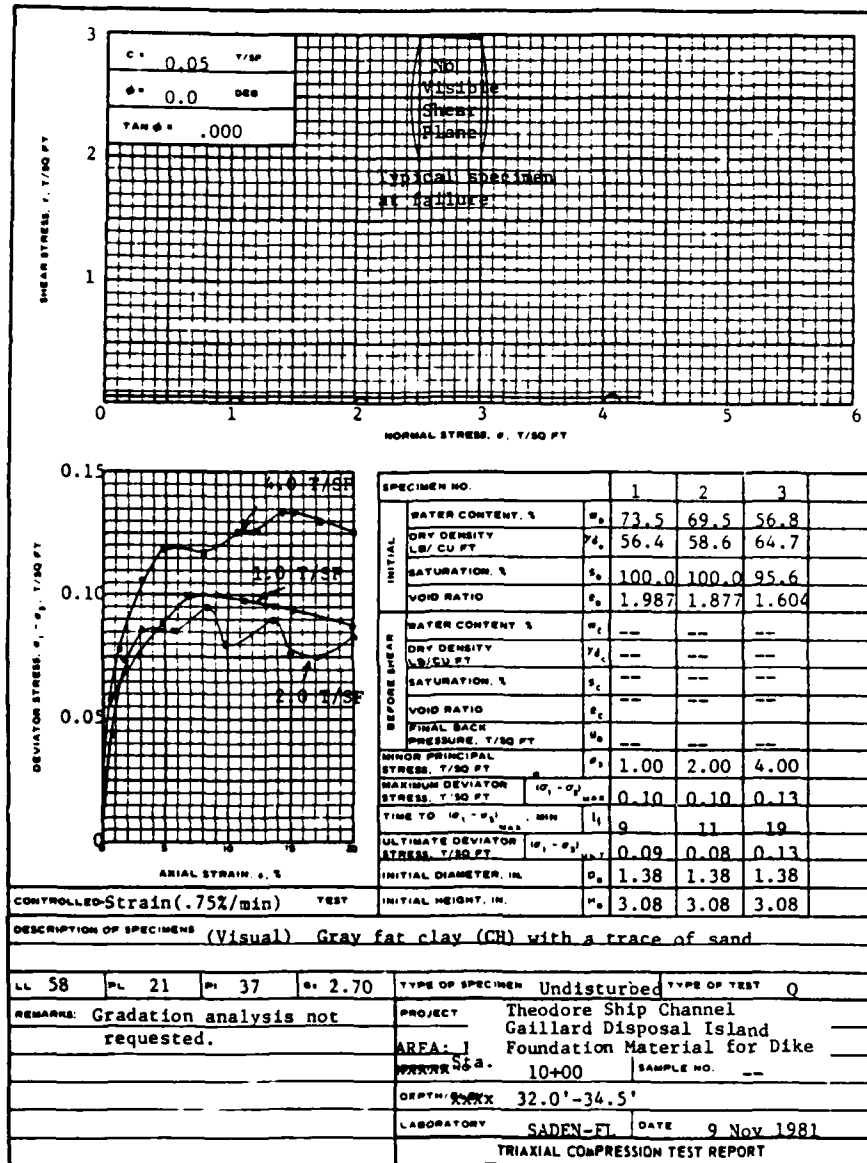


Figure 28. Triaxial compression test report on Q test for samples at Sta 10+00 and 32.0 - 34.5 ft depth

Reqn No. 95-81-F & M
Work Order No. 2952

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Visual

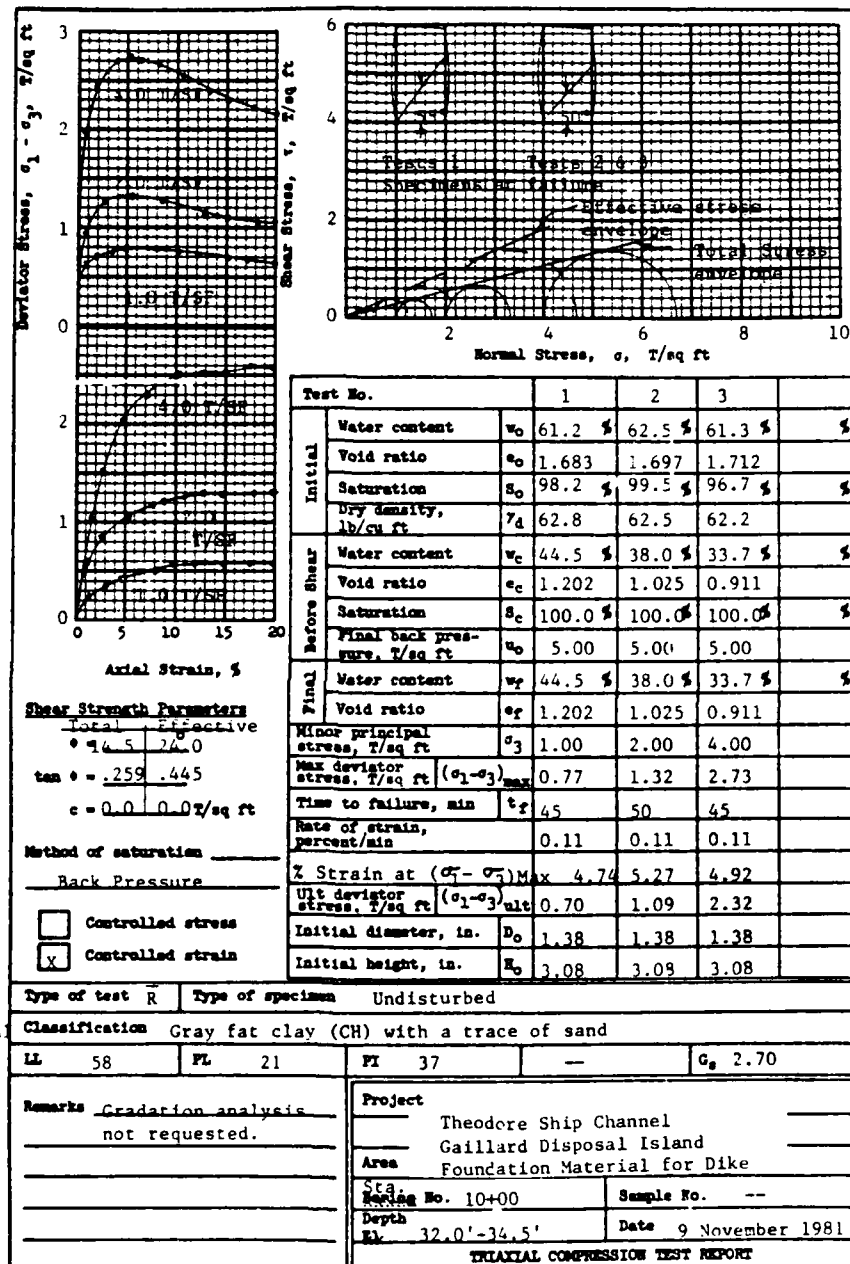
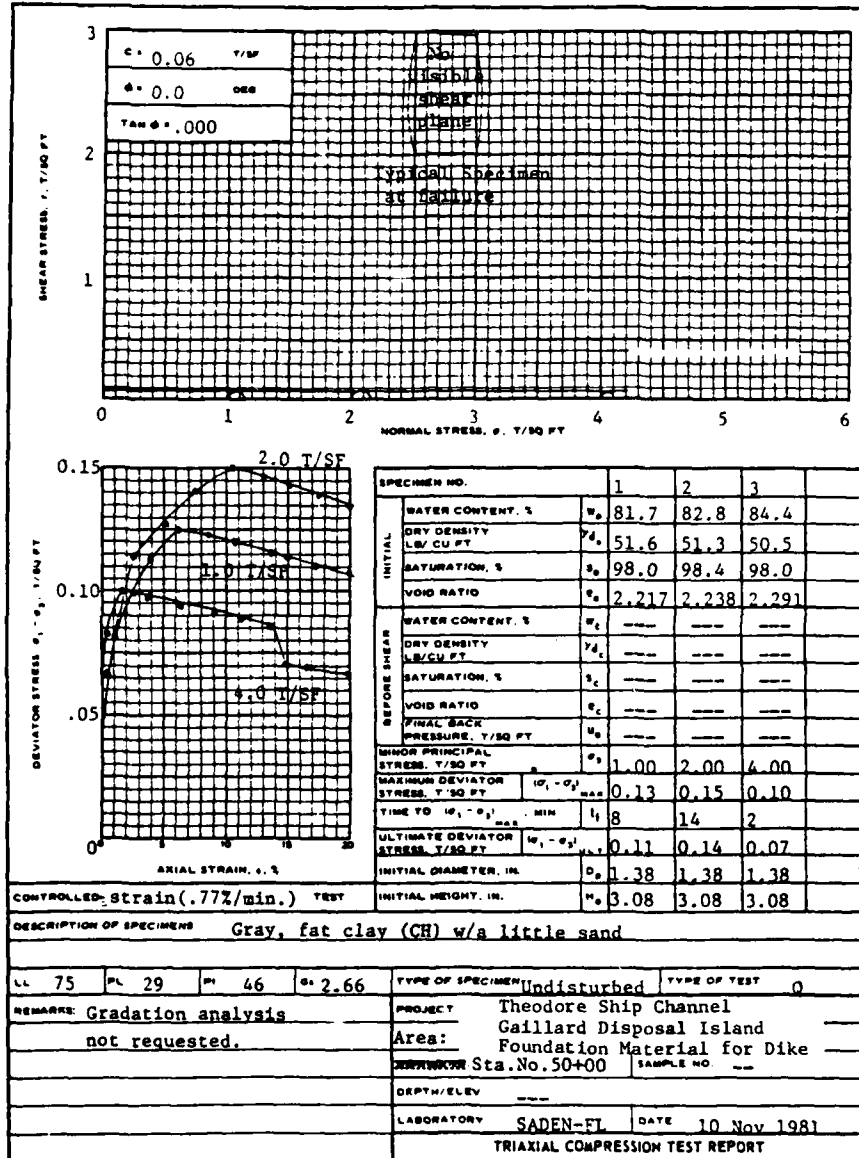


Figure 29. Triaxial compression test report on \bar{R} tests for samples of Sta 10+00 and 32.0 - 34.5 ft depth

WORK ORDER NO. 2952
REQ. NO. 95-81-F&M

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061



ENG FORM NO. 2088 PREVIOUS EDITION IS OBSOLETE TRANSLUCENT (EM 1110-2-1906)

Figure 30. Triaxial compression test report on Q test for samples at Sta 50+00 and undetermined depth

WORK ORDER NO. 2952
REQN. NO. 95-81-F&H

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Visual

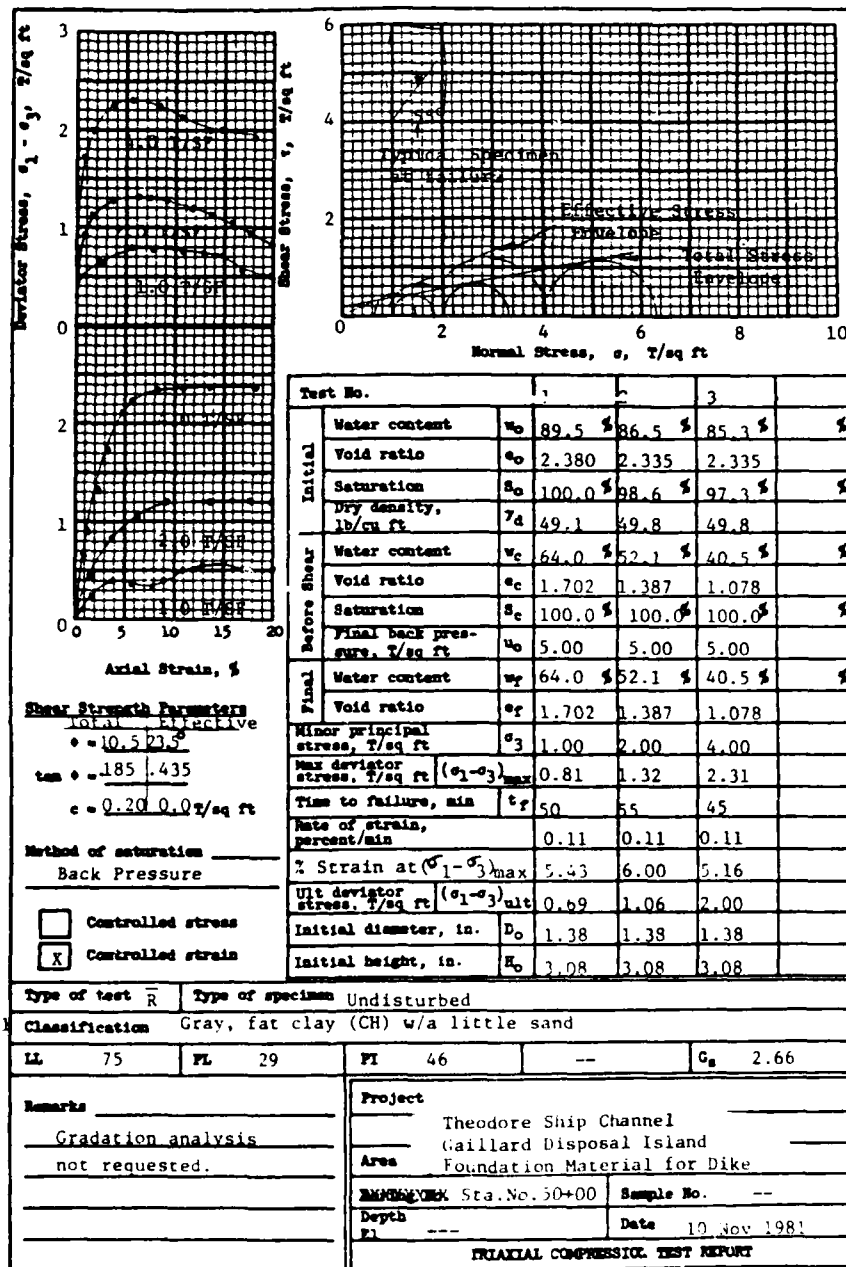


Figure 31. Triaxial compression test report on R test for samples at Sta 50+00 and undetermined depth

WORK ORDER NO. 2952
REQ. NO. 95-81-F & M

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 811 SOUTH COBB DRIVE, MARIETTA, GA. 30061

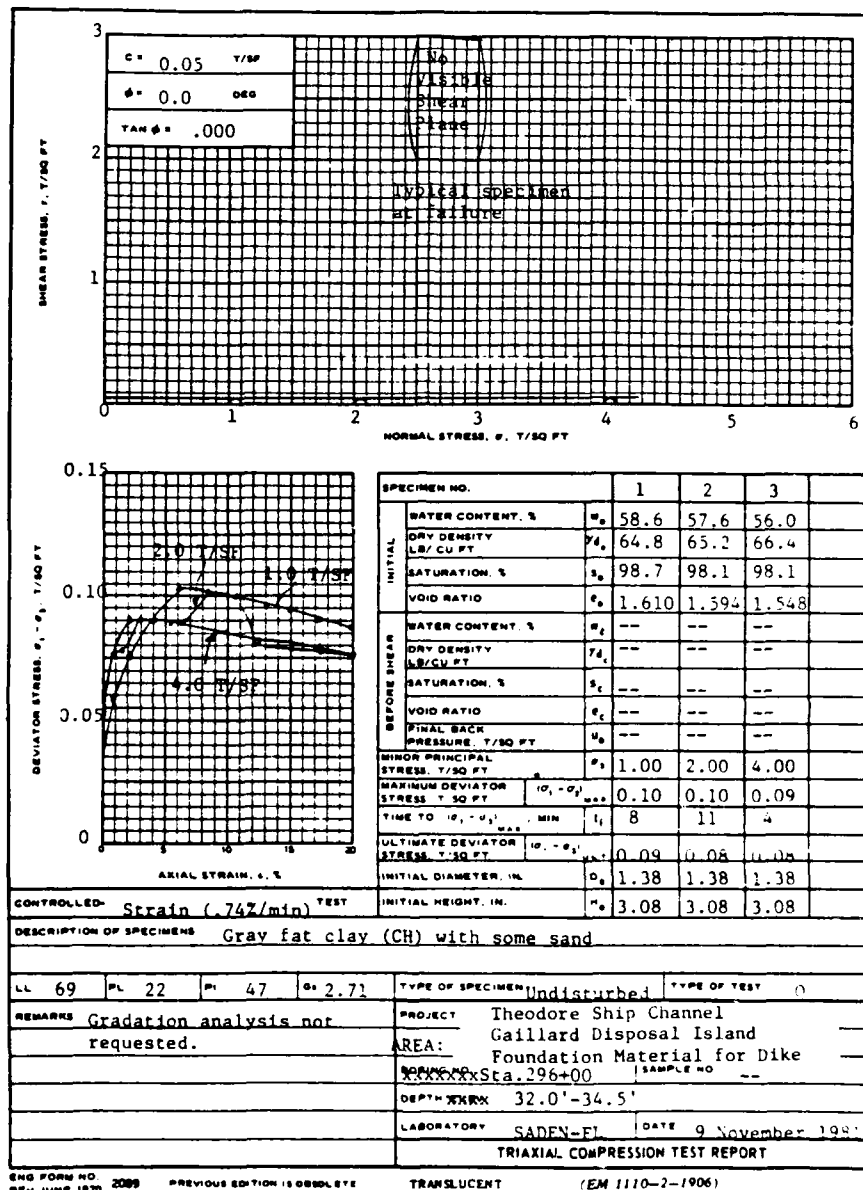


Figure 32. Triaxial compression test report on Q test for samples at Sta 296+00 at 32.0 - 34.5 ft depth

Reqn No. 95-81-F & M
Work Order No. 2952

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
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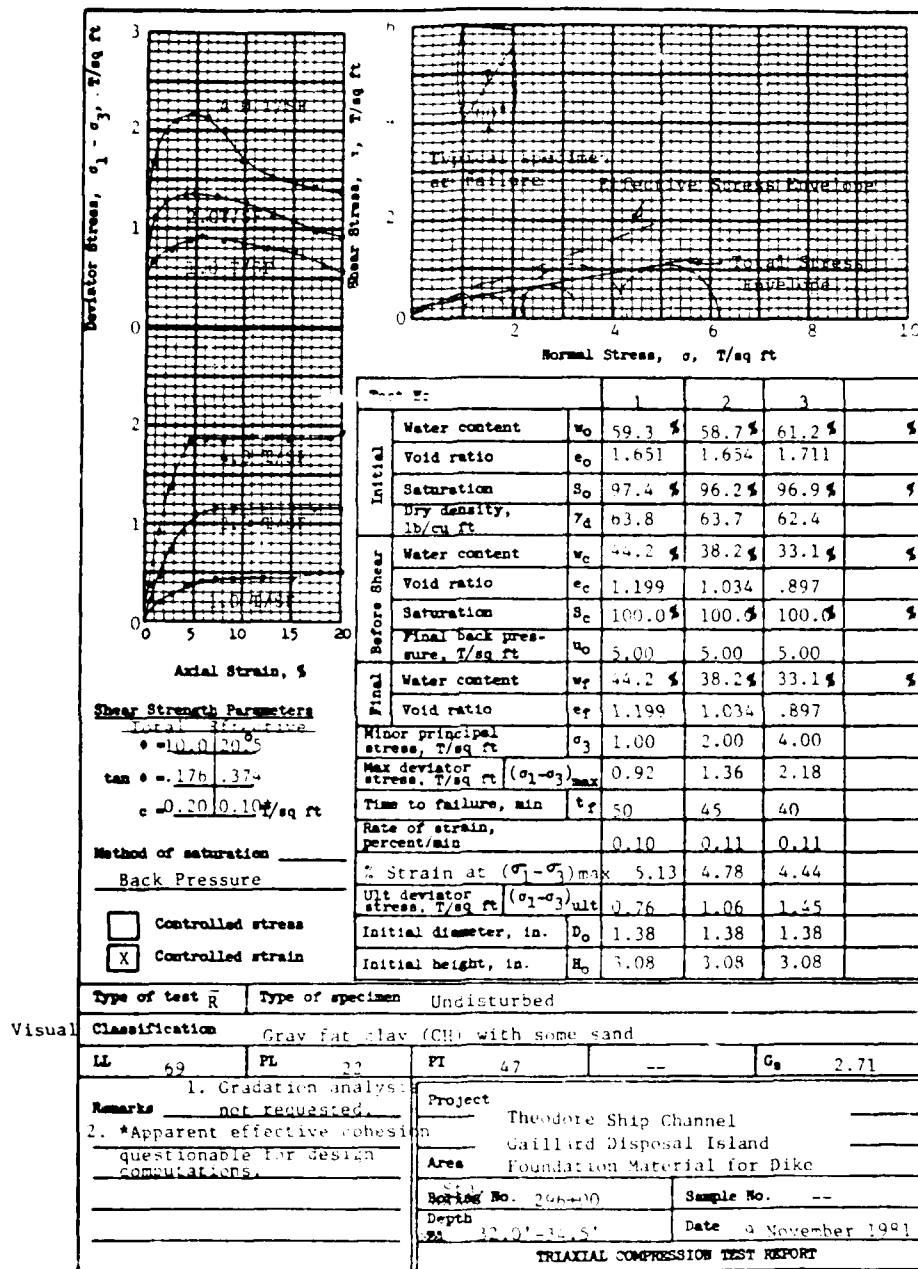


Figure 33. Triaxial compression test report on \bar{R} test for samples of Sta 296+00 at 32.0 - 34.5 ft depth

99. Gradation tests were conducted on 42 soil samples taken from the dike fill and foundation soils. The gradation curves for these soil samples are not contained in this report; however, they are available through the Mobile District Office. Most of the soil samples selected for the gradation tests were poorly graded, medium to fine sands with generally less than 10 to 15 percent silt and clay-size material.

Change in Soil Characteristics from Channel to Dike

100. There was a considerable change in the soil characteristics as they existed in the channel before dredging and after they were barge hauled and/or hydraulically pumped into the dike cross-section. An attempt was made to construct the dike cross-section with land-cut materials that contained primarily sand and stiff clays. The existing materials in the channel were alluvial deposits of sands, silts, clays, and small amounts of oyster shell and gravel. These natural materials were layered and fairly dense in the land-cut and loose in the bay-cut with the clays being normally consolidated. As a result of these materials being dredged, transported, and deposited as dike fill, the density significantly decreased with a subsequent increase in volume. It was assumed that the land-cut materials increased in volume, by about 30 percent and the bay-cut materials increased by about 50 percent. The sandy materials appeared to be cleaner, indicating a portion of the fines was washed out during dredging and placement. Large piles of clay balls formed at the end of the dredge pipes which required moving the hydraulic spill barge more than when placing sand. The slopes of these clay ball piles was very steep with repose angles of 45 deg. The clay ball normally ranged in size from 2 to 4 inches in diameter, but occasionally balls 12 to 16 inches in diameter came through the dredge pipe. As the photograph in Figure A20 shows some of the clay balls were very large. The consistency of the clay balls varied depending on the location from which it was dredged. The clay balls formed from land-cut materials were generally stiff and formed a surface firm enough to walk on immediately after placement, while, clay balls formed from the bay-cut materials formed a surface which required several days of drying before supporting a man. All clay ball surfaces were hard after drying and difficult to walk on. The clay balls surfaces cracked and weathered with the clay balls breaking into small pieces filling the surface voids. Voids

between clay balls below the surface were usually filled with sand, silt, and shell.

101. It was suspected the natural soils might contain a high percentage of Montmorillonite clay minerals which would have a tendency to disintegrate when resubmerged in water after it dried out. Considerable erosion has been observed since construction along the outside perimeter of the dike at corners of the island. The material used to construct the dike at these locations was clay balls which exhibits a tendency to erode rapidly. The areas that were constructed from clay balls could support vegetation quicker than areas constructed from sand. It was observed that if the clay balls were not allowed to dry after dredging, they seemed to erode less rapidly. The soft bay bottom deposits that were dredged by the Lenel Bean and deposited within the containment area formed a dry, hard, thick crust where the surface water has drained. Proper management of the containment area would likely improve the strength of the confined material and increase the containment areas long-term storage capacity.

Instrumentation

102. After the island was constructed, the Mobile District selected 12 locations along the dike alignment to be instrumented and monitored on a regular long-term basis. A plan view of the instrument locations is shown in Figure 34. Each location contained 12 surface settlement monuments, 12 deep settlement rods, and 16 piezometers. The purpose of the settlement monuments and deep rods was to determine the rate of settlement of the dike surface in relationship to the dike foundation. The purpose of the piezometers was to measure pore pressures in the foundation materials in the event of future dike raisings. The only instrumentation data reported by the Mobile District was settlement data from the 12 surface settlement monuments. This data is shown graphically in Appendix F. A land and hydrographic survey was performed at each instrument location. The profiles made from this survey are shown in Appendix G.

Settlement or subsidence

103. The settlement observations for the 12 surface settlement monuments are shown graphically in Figure 35. Presenting the data in this manner, illustrates the linear relationship between dike settlement and time. This relationship can be expressed as follows:

$$S = c \log t \quad (1)$$

where

S = settlement, in.

t = time, months (at end of construction)

c = constant (varies from 1.6 to 13.3 with an average of 7.5)

Equation (1) can be expressed in terms of settlement as a percentage of the dike height as follows:

$$P = 100 c_1 \log t \quad (2)$$

where

$c_1 = c/H$

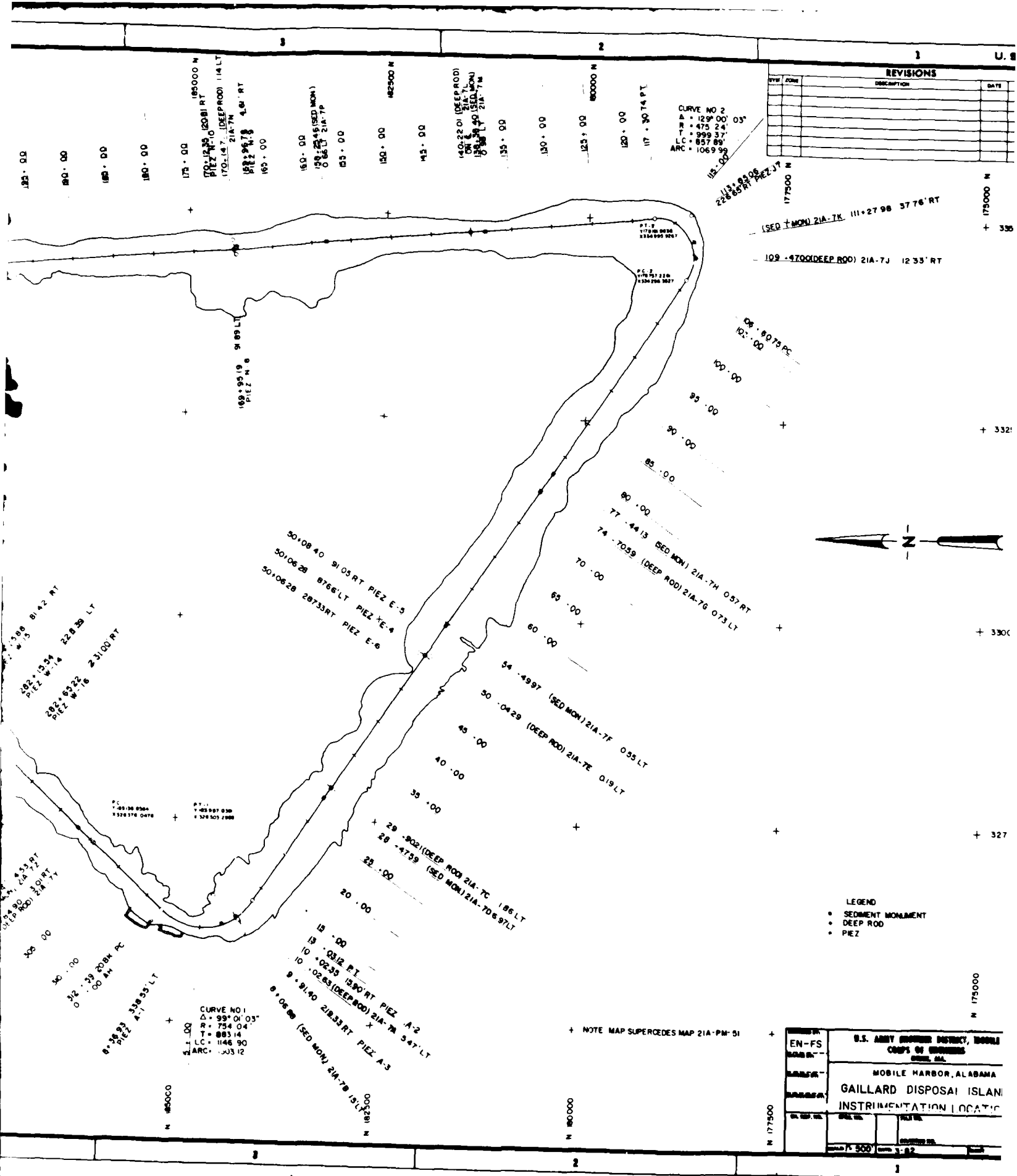
H = height of embankment, ft

where c_1 varies from 0.0083 to 0.07 with an average value of 0.04. An approximation of the average settlement of an embankment 16 ft high would be about 4 percent of the dike height or 7.7 in. after the first year. Consolidation of the dike and foundation materials will continue to take place for many years before complete consolidation is achieved.

104. The data plotted in Figure 35 indicates a settlement at station 253, of about 20 inches has occurred where the initial dike height was about el +12 ft mlw. Of the twelve locations monitored, seven are continuing to settle rapidly with an average settlement of about 14 inches/year. The consolidation rate will decline with time. Five of the locations monitored exhibited significant reduction in the rate of consolidation. Three of these locations are near the west corner of the island, at station 8, 28, and 298, which are in areas with considerably stronger foundation soils. One of the other locations of low subsidence is on the east dike where the fill depth was much too shallow because of previously placed dredged material. The other location was located in the area of the construction spillway which was filled with clean sand.

Theoretical consolidation analysis

105. A consolidation analysis was performed utilizing the data obtained by the Mobile District during the foundation investigation as part of the design phase. Table 6 contains a summary the consolidation data used in the analysis. An example of the calculations used to predict the amount of



Figure

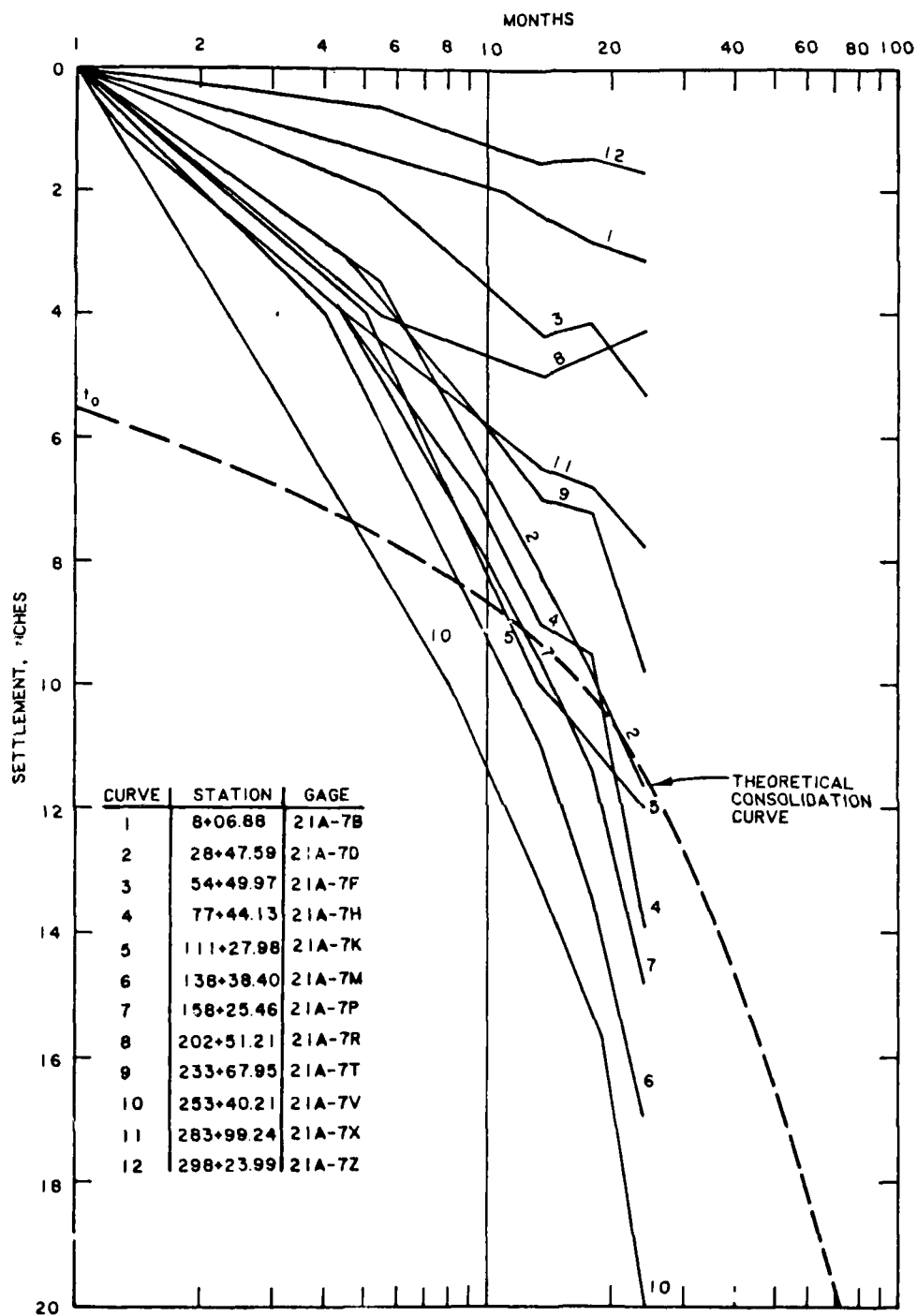


Figure 35. Subsidence of sediment measurements versus time on semilog plot and theoretical consolidation curve

consolidation for the embankment and foundation are shown in Table 7. The stresses likely generated with the foundation as a result of construction, the embankments were evaluated using Figures 36 and 37. The average coefficient of consolidation was estimated to be 0.015 ft^2 per day based on MDO laboratory consolidation tests. Because of the relative thickness of the soft foundation soils, an assumption of one-dimensional drainage was used. Consolidation within an embankment 16 ft high was predicted to be about 31 inches while the consolidation of a 31 ft thick soft clay foundation soil, was estimated to be about 78, for a total settlement of 109 inches of about 9.1 ft. Included in Table 8 are values for the percentage of consolidation, U; time factors, T; and example calculations for the rate of consolidation. A theoretical consolidation rate curve is shown in Figure 38 with the range of actual dike for the first two years shown. It was estimated that it may take over 800 years for complete dike and foundation settlement to occur.

106. Figure 35 shows a plot of the predicted consolidation values and the measured settlements. The predicted curve and an average of the settlement values are in good agreement. Consolidation predicted at the end of construction was about 5.5 inches, where t_0 equaled about two years. The average settlement measured two years after construction was about 7.7 inches, which makes a total of 13.2 inches. This value represents about 10 percent of the total predicted consolidation.

Embankment Slope Stability Analysis

107. A slope stability analysis was conducted for a typical dike and foundation cross-section shown in Figure 39. The analysis was made assuming end-of-construction strength parameters and loading conditions. Shear strength data used in the analysis is summarized in Table 9. Shear strength values selected for use in this analysis was based on laboratory and field data, in addition, considerable experience with projects in the area. The cohesion value selected for the silt embankment was 0.005 tsf with an angle of internal friction of 13 deg. The cohesive strength selected for the embankment foundation was 0.05 tsf and an angle of internal friction of 0 deg. The results of the stability analyses are shown in Figure 39. As shown in this figure, the minimum factor of safety was computed to be 3.06 and the next lowest safety factor of 4.99. Both of these slip surfaces were tangent to

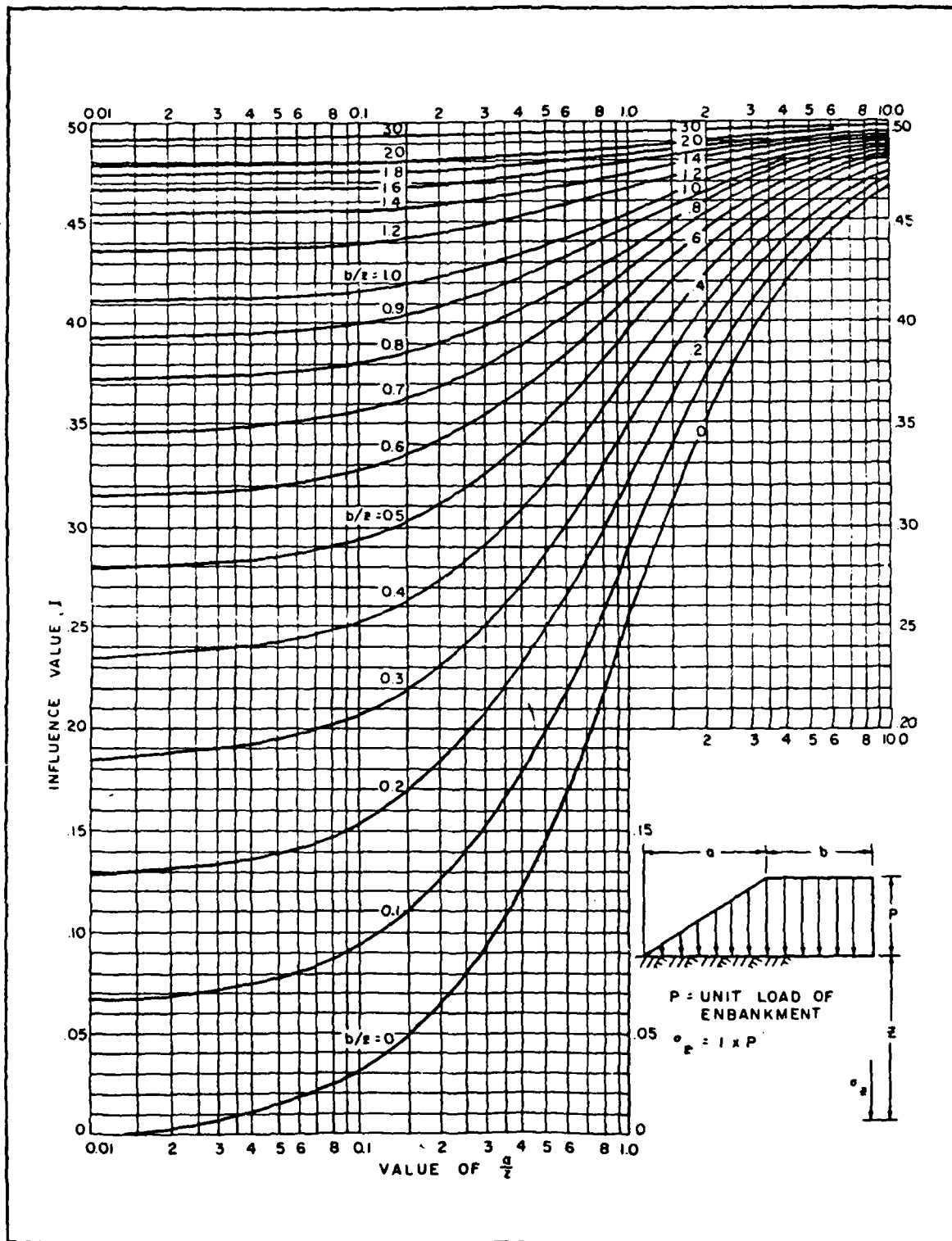


Figure 36. Influence value for vertical stress under embankment load of infinite length

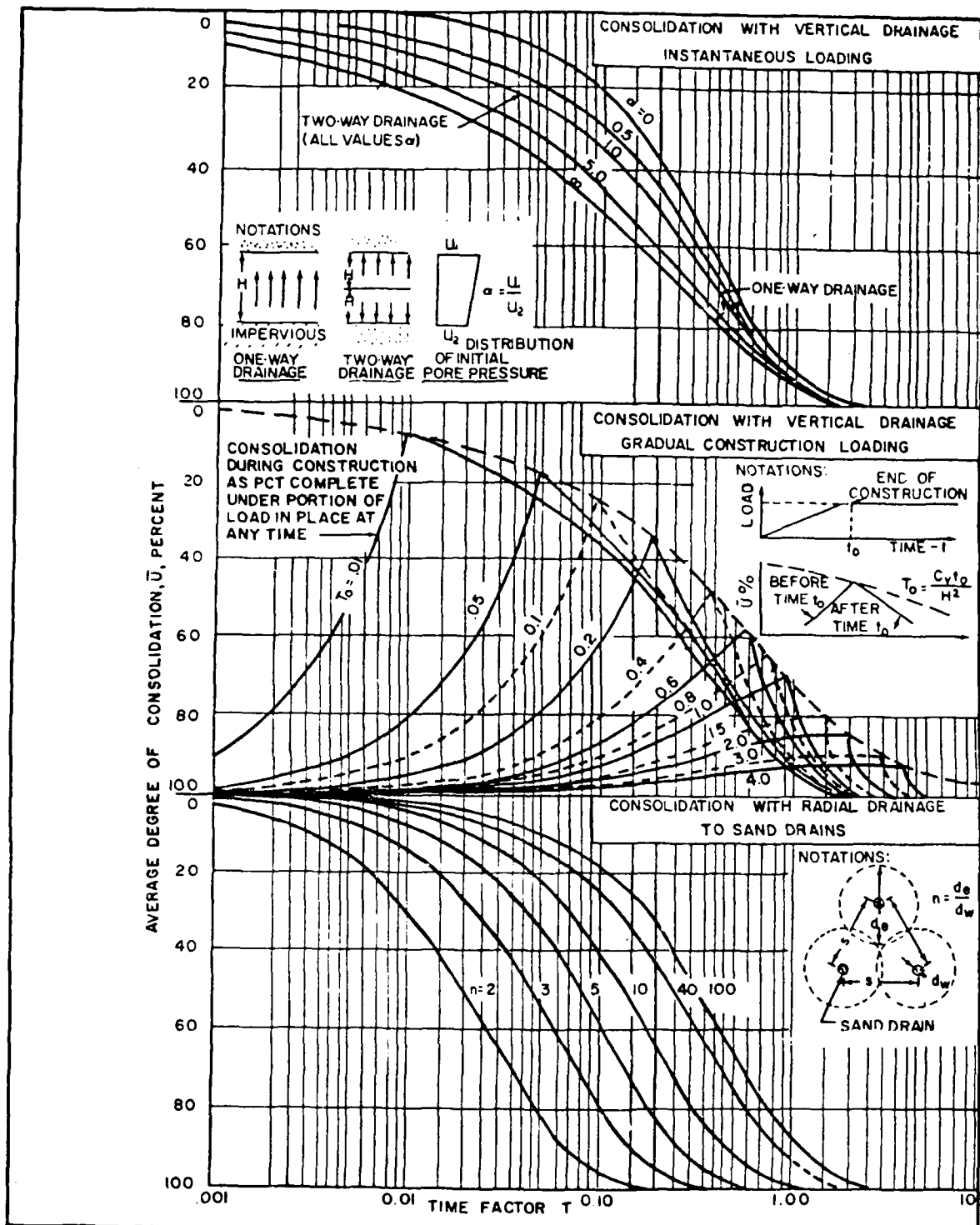


Figure 37. Time factors for consolidation analysis

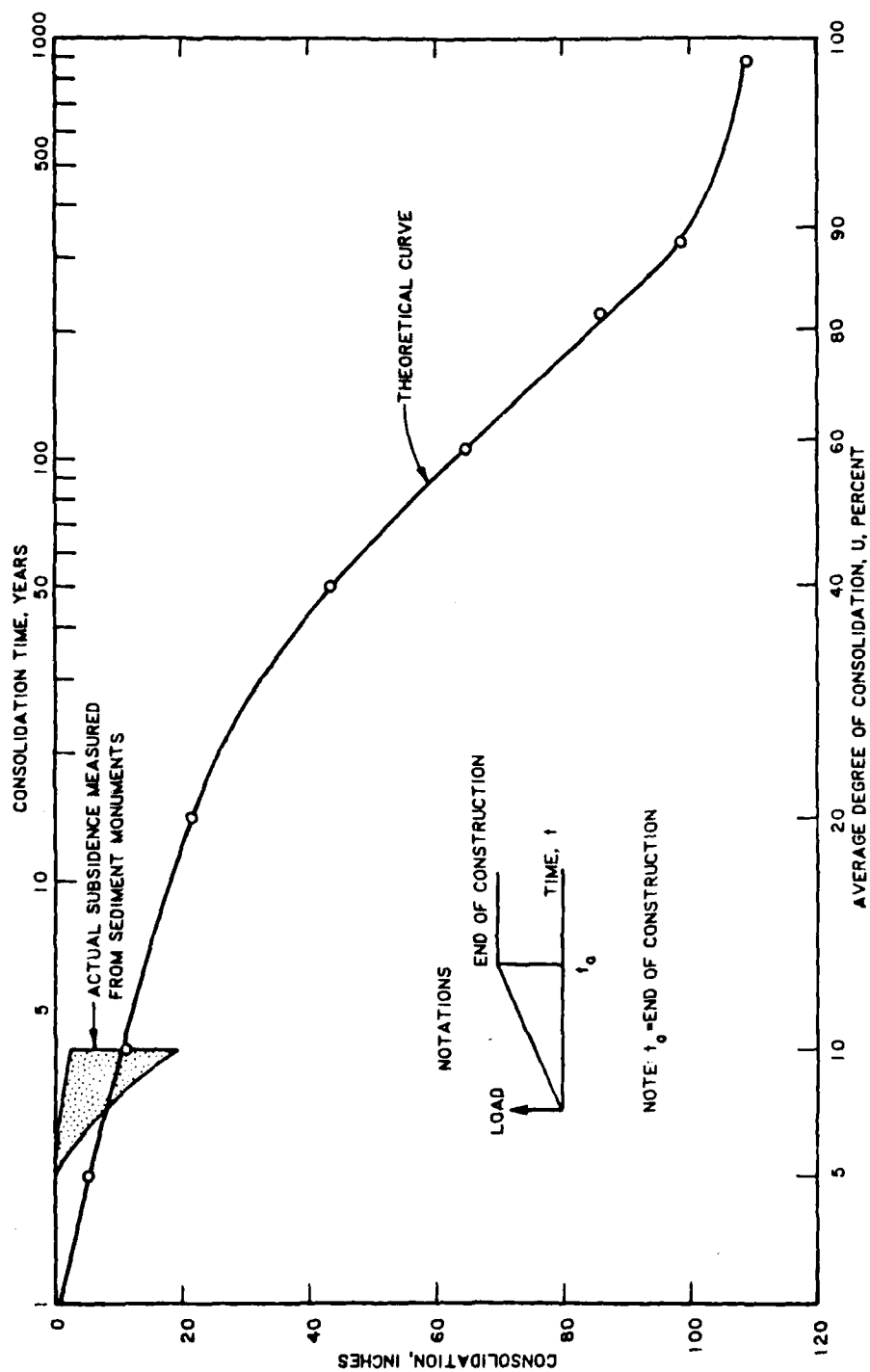


Figure 38. Predicted consolidation and percent consolidation and actual subsidence versus time

-9 ft mlw which corresponds to the dike and the foundation surface. Based on the relatively high factors of safety from the stability analysis and the fact that the embankment has not failed within the two years since construction, chances of failure are not likely.

Embankment Protection

108. Significant dike settlement and erosion could result in a failure of the retaining dike with a subsequent loss confined dredged material. Should a dike failure occur, the soft confined material area would probably erode very rapidly; therefore, it was proposed that the east dike and the north and south corners of the island be protected with a 4 ft high, embankment sloped to 1V on 3H and protected with riprap. A cross-section of the proposed embankment is shown in Figure 11. It was also suggested that select marsh grasses be established on the west and south dikes and the west corner to resist erosion.

109. Immediately after construction of the first phase of the perimeter dike, successful vegetation plots were established. After the perimeter dike was completed, continued experimentation was conducted by the WES to develop proper planting procedures and techniques. Construction of a riprap and geotextile protected embankment is presently proceeding on the perimeter dike at Gaillard Island.

PART VIII: CONCLUSIONS AND RECOMMENDATIONS

110. It is concluded that the dike design and construction techniques employed in building of Gaillard Island area were satisfactory. During construction, the embankment experienced several small localized displacement failures and mud waves that caused the soft bay bottom clays to mix with the new dredged material. Slope stability analyses were conducted on a representative dike cross-section and it was concluded that a minimum factor of safety against a rotational failure of 3.06 existed. Vegetation has been planted to enhance erosion protection. A riprap dike is presently being constructed to prevent overtopping of the constructed dikes.

111. Based on a consolidation analyses of the embankment and foundation soils it is estimated that over 800 years would be required for consolidation to be complete. Average settlement of the dikes two years after construction was about 13.2 inches. Laboratory consolidation data coupled with conventional consolidation analysis was found to adequately predict the settlement of the embankment.

112. It was concluded that without the data base management system (DBMS) designed by WES, it would have been extremely difficult to handle the 828 days of data generated from the three dredges. Use of the DBMS made it possible to record and present the dredging records in a usable form. In addition, the DBMS made it possible to monitor the volumes and percentage of sand, silts, clays, shell, and gravels that were excavated and filled in each leg of the island. Retention rates of the total volume of dredged material in the dike and containment area was about 61 percent. The 39 percent unaccounted for the total 33.5 million cubic yards of dredged material was not unreasonable since 95 percent of bay-cut and 52 percent of the in channel and turning basin material was of fine silts and clays. About 20.6 million cubic yards of dredged material was estimated to have remained in the island during construction and about 12.9 million cubic yards was unaccounted for.

113. There was a considerable difference in the consistency of the channel-cut materials after they were barge hauled or hydraulically placed in the dike. Stiff clays that formed into clay balls as they rolled along the dredge pipe made good construction fill material which formed dike slopes greater than 1V on 1H. Sand, silts, and loose clays usually filled the voids between the clay balls, thus providing for a stronger and more impermeable

dike. It was found that clay balls from stiff clays could support some loads immediately after placement. The clay balls ranged in size from 2 to 4 inches with occasional balls as large as 12 to 16 inches. After the clay balls dried they became very hard and cracked and weathered with a subsequent filling of the surface voids.

114. The dikes made from clays, silts, and sands varied from an average slope of about 1H:32H to 1V:45H. Dikes constructed primarily from sand varied from an average slope of 1V:53H to 1V:61H. Dikes constructed from clay balls had more identifiable scarped slopes which eroded more readily than dikes constructed of sand. Slopes of dikes made from clay balls supported vegetation better than slopes constructed from sand. Sands hydraulically placed usually appeared to be very clean which indicated the fines were probably washed out during placement. Since the completion of construction in August 1981, significant erosion has occurred on the outboard slope of dikes at the island's three corners.

115. It was concluded that the barge haul method used to excavate sand and stiff clay was successful. The dust pan dredge was effective in excavating the soft clay deposits in Mobile Bay.

116. It is recommended:

- a. The Mobile District implement a dredged material management plan to preserve Gaillard Island as an area for future storage of maintenance dredged material. Since dredged material containment areas are limited in the Mobile area, it is important that this disposal area be properly managed.
- b. Continue to monitor the settlement monuments at intervals not to exceed once a year.
- c. The DBMS should be utilized in determining contract estimates and to document the dredging operation and performance. The DBMS should be used to record the type, volume, and geotechnical classification of the dredged materials.
- d. The Corps of Engineers should encourage the contractors to maintain and provide more accurate records of material volumes, cut and fill stations, and soil types.

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VERIFICATION OF DESIGN AND CONSTRUCTION TECHNIQUES FOR

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GALLARD ISLAND DR. (U) ARMY ENGINEER MATERNAVS

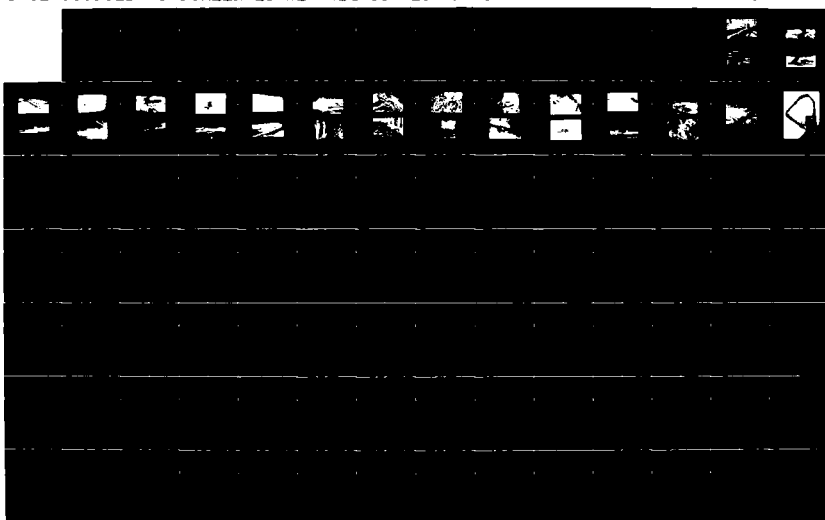
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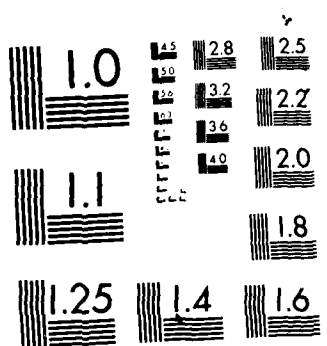
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Table 1
Dredged Material Placement and Construction Sequence

<u>Placement Dates</u>		<u>Dike Fill Stations</u>	
<u>Start</u>	<u>Stop</u>	<u>Start</u>	<u>Stop</u>
<u>JIM BEAN DREDGE</u>			
29 Nov 79	12 Jan 80	268+00	231+00
13 Jan 80	20 Mar 80	292+00	47+00
20 Mar 80	16 Apr 80	47+00	7+00
3 Jan 81	27 Jan 81	302+00	310+50
31 Jan 81	18 May 81	154+00	231+00
19 May 81	15 Jun 81	231+00	268+00
17 Jun 81	28 Jul 81	291+00	273+75
29 Jul 81	28 Aug 81	254+00	228+00
<u>DAVE BLACKBURN DREDGE</u>			
8 Jan 80	12 Jan 80	291+00	291+75
13 Jan 80	24 Feb 80	231+00	203+00
27 Feb 80	9 Apr 80	253+50	275+00
10 Apr 80	29 Apr 80	274+50	253+00
30 Apr 80	17 May 80	253+00	235+00
18 May 80	15 Dec 80	61+00	164+25
16 Dec 80	5 Jan 81	50+00	65+00
6 Jan 81	26 Feb 81	52+00	3+00
2 Mar 81	29 Mar 81	305+75	290+00
30 Mar 81	6 Jun 81	53+00	157+00
7 Jun 81	28 Jul 81	73+00	109+00
<u>LENEL BEAN DREDGE (DUST PAN)</u>			
	13 Jan 81	104+00	
	28 Jan 81	88+00	
	14 Feb 81	71+50	
	25 Feb 81	52+50	
	5 Mar 81	34+00	
	18 Mar 81	14+00	
	25 Mar 81	43+00	
	29 Mar 81	26+00	
	2 Apr 81	64+00	
	2 May 81	117+00	
	7 May 81	25+00	
<u>BARGE HAUL OPERATION</u>			
20 Oct 79	29 Jan 80	26+50	49+50
8 Jan 80	8 Jan 80	26+50	24+00
31 Jan 80	13 Apr 80	60+00	102+00

TABLE 2

Gaillard Disposal Island
Dike Slopes, Fill Depths, and Material Types

Boring	Station	Inside		Outside		Elevation, ft		Type of Material*
		Offset ft	Slope	Offset ft	Slope	Original Bay Bottom (mlw)	Dike Centerline	
T01-1-81	0+06	--	1:35	5	1:35	-9.0	4.9	Clay Balls
T01-2-81	8+37	340	1:80	--	--	-9.0	3.2	Clay Balls
T01-3-81	10+02	--	1:80	15	1:35	-9.6	8.0	Sand
T01-4-81	9+91	--	--	205	1:35	-16.8	2.7	Sand
T01-5-81	20+00	0	1:55	0	1:30	-10.0	8.2	Sand
T01-6-81	30+00	--	1:55	15	1:40	-11.8	--	Clay Balls
T01-7-81	40+00	0	1:55	0	1:70	-12.0	6.4	Sand
T01-8-81	50+06	90	1:55	--	--	-11.0	6.4	Sand&Shells
T01-9-81	50+08	--	--	90	1:55	-11.8	5.0	Sand
T01-10-81	50+06	--	--	290	1:60	-12.0	1.5	Sand
T01-11-81	60+00	0	1:35	0	1:85	-11.0	11.2	Clay Balls
T01-12-81	70+00	0	1:20	0	1:70	-9.0	8.0	Clay Balls
T01-13-81	80+00	0	1:20	0	1:40	-9.0	8.7	Clay Balls
T01-14-81	101+50	--	--	40	1:45	-9.0	7.9	Clay Balls
T01-15-81	113+85	--	--	225	1:55	-10.0	2.2	Clay Balls
T01-16-81	120+00	0	--	0	1:55	-11.0	6.4	Clay Balls
T01-17-81	130+00	0	--	0	1:55	-9.0	5.1	Clay Balls
T01-18-81	140+00	0	1:25	0	1:30	-9.0	9.0	Clay Balls
T01-19-81	150+00	--	1:15	40	1:40	-8.8	8.0	Clay Balls
T01-20-81	160+00	0	1:170	0	1:90	-9.6	4.6	Sand
T01-21-81	169+95	90	1:250	--	--	-9.0	3.5	Sand
T01-22-81	169+97	--	1:250	5	1:40	-9.0	3.5	Sand
T01-23-81	170+12	--	--	120	1:40	-9.0	2.5	Sand
T01-24-81	180+00	0	1:85	0	1:45	-9.0	7.7	Sand
T01-25-81	190+00	0	1:75	0	1:55	-9.3	4.1	Sand
T01-26-81	200+00	0	1:80	0	1:45	-9.0	4.2	Sand
T01-27-81	210+00	0	1:45	0	1:50	-9.0	5.4	Sand
T01-28-81	220+00	0	1:25	0	1:35	-8.0	6.0	Clay Balls
T01-29-81	240+00	0	1:25	0	1:30	-10.0	12.5	Clay Balls
T01-30-81	250+00	0	1:15	0	1:40	-10.0	11.3	Clay Balls
T01-31-81	260+00	0	1:25	0	1:20	-10.0	12.9	Clay Balls
T01-32-81	270+00	0	1:70	0	1:75	-10.0	5.0	Sand
T01-33-81	282+15	210	1:35	--	--	-10.1	2.5	Clay Balls
T01-34-81	282+25	--	--	80	1:30	-10.0	2.2	Clay Balls
T01-35-81	282+65	--	--	230	1:70	-10.0	0.7	Clay Balls
T01-36-81	290+00	0	1:30	0	1:70	-10.0	8.2	Sand
T01-37-81	300+00	0	1:30	0	1:60	-10.4	5.8	Clay

* Visual observation of surface

Table 3
Dredged Material Volumes, Soil Types, and Percent Distribution

Location	Volume	Soil Type, Percent Distribution*				
	Million cu yd	Sand	Silt	Clay	Shell	Gravel
<u>Barge Haul Cut Operation</u>						
Landcut	2.3	35	15	49	0.3	
<u>Hydraulic Dredge Cut Operation</u>						
Jim Bean - Landcut	0.9	48	1.7	47	--	--
- Baycut	6.9	29	7.5	60	1.0	0.1
Dave Blackburn - Landcut	5.3	32	17	50	0.4	--
- Baycut	7.4	20	23	55	1.4	--
Lenel Bean - Baycut	<u>5.3</u>	0.1	5.6	69	25	--
Total Volume	28.0					
<u>Hydraulic Dredge Cut Operation</u>						
Baycut	19.6	18	13	61	8	--
Landcut	<u>6.1</u>	35	15	49	0.3	--
Total Volume	28.0					
<u>Barge Haul Fill Operation</u>						
South Dike Leg	1.1	35	15	49	0.3	
East Dike Leg	<u>1.2</u>	35	15	49	0.3	
Total Volume	2.3					
<u>Hydraulic Dredge Fill Operation</u>						
South Dike Leg	9.1	21	21	56	1	--
East Dike Leg	4.3	38	9	53	0.4	0.2
West Dike Leg	7.0	28	14	56	1	--
Inside Dike Containment Area (Lenel Bean Dredge)	<u>5.3</u>	0.1	5.6	69	25	--
Total Volume	28.0					

* Soil percentages estimates because of lack of good daily records of soils types and percentages.

Table 4

Dredged Material Volumes

Total Volume	Contract Advertised Government Estimate	Reported by Contractor Only Dredge Reports	Channel Cut Cross- Section Yardage Paid Contractor	Channel Cut Cross- Section Gross Yardage Including Overcut Dredged by Contractor
	Cubic Yards	Cubic Yards	Cubic Yards	Cubic Yards
Baycut	19,573,000	19,577,429	19,837,047	21,598,302
Landcut	<u>11,532,000</u>	<u>8,378,697</u>	<u>11,456,738</u>	<u>11,935,933</u>
Total	31,105,000	27,956,126	31,293,786	33,534,235

Breakdown by Dredge Operation

Barge Haul Operation	-	2,260,325	3,129,379	Mobile District adjusted these yardage according to percentage dredged on daily records by each dredging operation
Landcut	-	867,992	969,231	
Jim Bean Dredge Landcut Baycut	-	6,867,337	7,386,210	
Dave Blackburn Dredge	-	5,250,380	5,622,742	
Landcut	-	7,367,619	7,958,761	
Baycut	-	5,342,473	6,227,463	
Lenel Bean Dredge Baycut	-	27,956,126	<u>*31,293,786</u>	

Dredging Cost to Government

Location	Cost Per Yard	Pay Yards	Cubic Yards	Amount Paid Contractor
Baycut	\$0.88	X	19,837,047	= 17,456,601.36
Landcut	2.216	X	11,456,738	= 25,388,131.41
Total Cost				= 42,844,732.77

Table 5

Vane Shear Data, Gaillard Disposal Island

<u>Boring No.</u>	<u>Location</u>	<u>Elevation mlw</u>	<u>Field Vane Shear Strength, tsf</u>	
			<u>Not Corrected*</u>	<u>Corrected**</u>
TDI-3-81	sta 10+02	-23.84	0.34	0.27
TDI-9-81	sta 50+00	-14.72	0.13	0.10
TDI-12-81	sta 70+00	-16.39	0.12	0.10
TDI-15-81	sta 113+85	-12.40	0.17	0.14
TDI-18-81	sta 140+00	-13.31	0.21	0.17
		-17.71	0.39	0.31
TDI-22-81	sta 169+97	-14.96	0.07	0.06
		-18.96	0.23	0.18
TDI-26-81	sta 200+00	-14.61	0.07	0.06
		-19.61	0.13	0.10
TDI-34-81	sta 282+26	-18.60	0.03	0.02
TDI-37-81	sta 300+00	-26.5	0.13	0.10

* Vane shear testing conducted between Sep 1981 and Nov 1981 (after fill completion)

** Corrected by Bjerrum's recommended curve (Ref. 3) for average PI of 50% from which a correction factor of 0.8 was obtained.

TABLE 6
Summary of Consolidation Test Data

Boring	Sample	Depth (ft)	$P_2 = 0.5 \text{ T/ft}^2$		$P_2 = 0.37 \text{ T/ft}^2$		Consolidation Coefficient CV
			e_o	e_2	e_2	ft^2/day	
UND-2-75	1	4.0 - 6.0	3.974	2.58	2.65	0.021	
UND-2-75	2	6.0 - 8.0	3.806	2.66	2.85	0.019	
UND-2-75	4	10.0 - 12.0	3.249	2.40	2.60	0.014	
UND-2-75	6	14.0 - 16.0	3.323	2.40	2.60	0.011	
UND-2-75	8	18.0 - 20.0	3.141	2.560	2.70	0.013	
UND-2-75	10	22.0 - 24.0	3.141	2.550	2.65	0.011	

TABLE 7

Consolidation Calculated for Embankment and Foundation

A. Embankment Consolidation

$$\text{Pressure at } P_A = (7 \text{ ft}) (100 \text{ pcf}) + (1 \text{ ft}) (37.5 \text{ pcf}) = 738 \text{ pcf}$$

$$P_A = 0.37 \text{ TSF}$$

$$\text{From above } e_2 = 2.6 \text{ and } e_1 = e_0 = 3.3$$

$$\text{Consolidation } \Delta H = H_1 \left(\frac{e_1 - e_2}{1 + e_0} \right) = 16 \left(\frac{3.3 - 2.6}{1 + 3.3} \right) = 2.6 \text{ ft or 31 inches}$$

B. Foundation Consolidation

$$\text{Pressure at Dike Base } P_1 = (7 \text{ ft}) (100 \text{ pcf}) + (9 \text{ ft}) (37.5 \text{ pcf})$$

$$P_1 = 1038 \text{ psf}$$

$$\text{Where } a = 800 \text{ ft, } b = 10 \text{ ft } a/Z = \frac{800 \text{ ft}}{15.5 \text{ ft}} = 51.6 > 10; b/Z = \frac{10}{15.5} = 0.65$$

$$\text{From the Influence Chart 5-5 of NAV FAV 7.1, } I = 0.33$$

$$\text{Then the Dike Vertical Stress at B } = \sigma_B = ZIF, = (2) (0.38) (1038 \text{ psf}) = 685 \text{ psf}$$

$$\text{Overburden Pressure from Bay Bottom Materials } = P_0 = (15.5 \text{ ft}) (25 \text{ pcf}) = 388 \text{ psf}$$

$$\text{Sum of Pressure at } P_B = P_0 + \sigma_B = 388 \text{ psf} + 685 \text{ psf} = 1073 \text{ psf or about 0.5 tsf}$$

$$\text{From Table Above } e_0 = 3.3 \text{ and } e_2 = 2.4$$

$$\text{Then } \Delta H = H_2 \left(\frac{e_0 - e_2}{1 + e_0} \right) = 31 \left(\frac{3.3 - 2.4}{1 + 3.3} \right) = 6.5 \text{ ft or 78 inches}$$

$$\text{Total Consolidation of Dike and Foundation } = 31 \text{ in.} + 78 \text{ in.} = 109 \text{ in. or 9.1 ft}$$

TABLE 8
Theoretical Consolidation Analysis

Percent Consolidation %	Time Factor T	Time Days	Years	Consolidation Inches
5	0.004	628 = t_0	2	5.5
10	0.01	1,470	4	10.9
20	0.035	5,150	14	22
40	0.125	18,410	50	44
60	0.26	30,290	105	65
80	0.55	81,000	222	87
90	0.8	117,800	323	98
100	2.0	295,000	806	109

*Sample Calculation:

$$T_c = \frac{t_c C_v}{H^2} = \frac{t_0 C_v}{H_e^2 + H_T^2}$$

Where

$C_v = 0.015 \text{ ft}^2/\text{day}$ consolidation coefficient

$H_e = 16 \text{ ft}$, height of dike

$H_T = 31 \text{ ft}$, thickness of clay layer

$t_0 = 628 \text{ days}$, consolidation period

$$T_c = \frac{628 \text{ days} (0.015 \text{ ft}^2/\text{day})}{(16 + 31)^2} = 0.00426$$

$$t_{20} = \frac{H^2 C_v}{C_v}$$

$$t_{10} = \frac{16 + 31^2 (0.015)}{(0.015)} = 5,150 \text{ days}$$

*See Figure 36 (used NAV-FAC DM7-Fig 6-6)

Table 9
Shear Strength Test Data

Boring No.	Field Vane	Laboratory Tests		
	Corrected Vane Strength (Q)	uu (Q)	cu (R)	Drained (S)
TDI-3-81	0.27	0.05	$\phi = 14.5$ $c = 0$	$\phi = 24$ $c = 0$
TDI-9-81	0.10	0.06	$\phi = 10.5$ $c = .20$	$\phi = 23.5$ $c = 0$
TDI-12-81	0.10			
TDI-15-81	0.14			
TDI-18-81	0.17 0.31			
TDI-22-81	0.06 0.18			
TDI-26-81	0.06 0.10			
TDI-34-81	0.02			
TDI-37-81	0.10	0.05	$\phi = 10$ $c = 0.20$	$\phi = 20.5$ $c = 0.10$
Mean	0.13			

Selected Shear Strength Design Data

Soil Type	Description	Density	Q		R		S	
		pcf, γ_{sat}	c ksf	ϕ deg	c (ksf)	ϕ (deg)	c (ksf)	ϕ (deg)
Silt sand	loose	110	0	26	0	19	0	28
EM Silt	none plastic and loose	110	0.01	13	0.01	13	0	20
FN Clay	very soft	110	0.10	0	0.20	10	0	20

APPENDIX A: PHOTOGRAPHS OF CONSTRUCTION SEQUENCE AND TECHNIQUES

1. This appendix is included to illustrate photographically the construction sequence of Gaillard Island Dredged Material Containment Area.



Figure A1. Hydraulic model testing conducted at WES to determine optimum island shape



Figure A2. Downtown mobile showing congested harbor facilities looking north along Mobile River



Figure A3. A view of the mouth of Deere Creek looking west
at Theodore, AL, before construction



Figure A4. A view of the mouth of Deere Creek looking west
during dredge operations for the Theodore Industrial Park



Figure A5. A view of the barge canal looking east toward the mouth of Deere Creek, the Theodore Industrial Park, and the ship turning basin



Figure A6. Dragline sitting on the bank excavating material from the ship turning basin and loading it onto a barge used to haul material to Gaillard Island

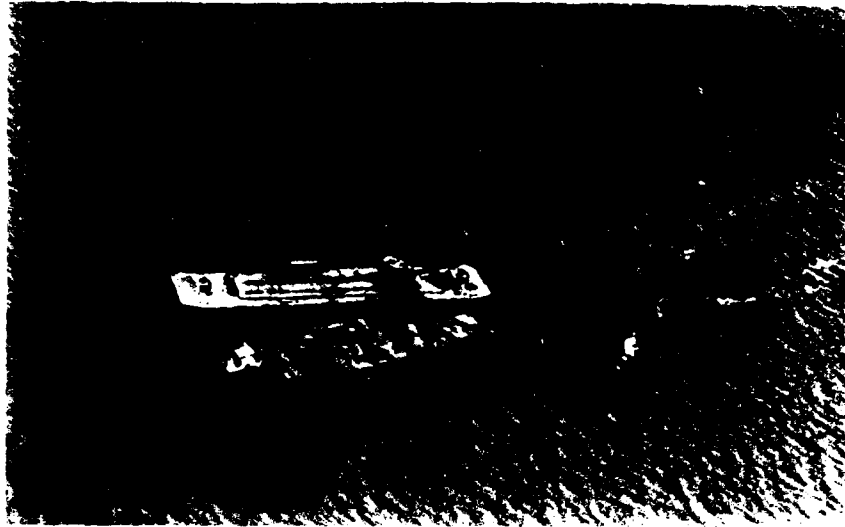


Figure A7. Barge load of material being positioned along
spud barge and dragline used to unload barge material along
dike alignment



Figure A8. Dragline dragging material from barge to con-
struct the first four feet of perimeter dike



Figure A9. Looking east toward the mouth of Deere Creek showing the Dave Blackburn dredge excavating dredged material from ship turning basin



Figure A10. Dredged material being discharged along the dike alignment from a specially constructed discharge barge

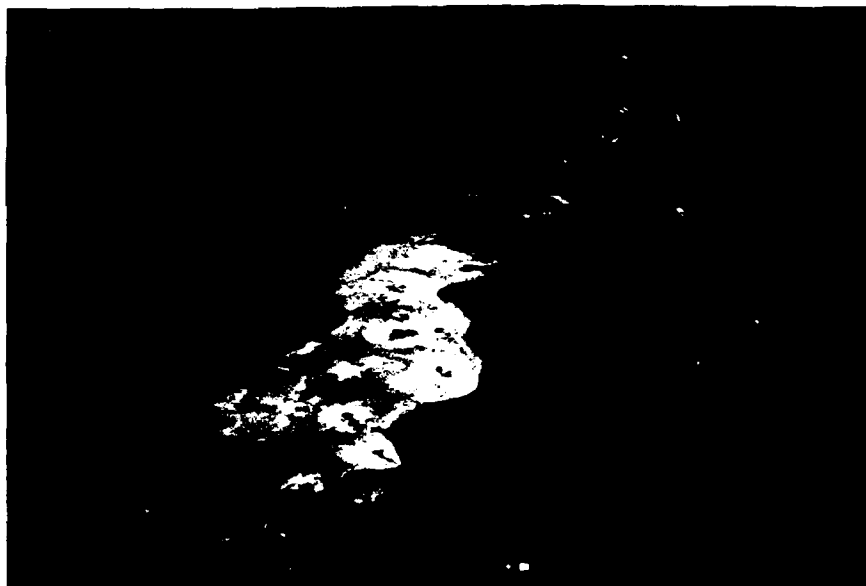


Figure A11. Construction of the dike during the initial placement of dredged material

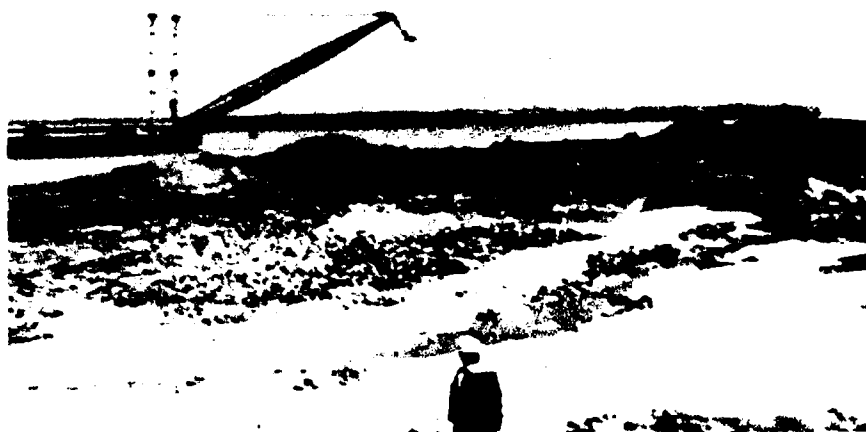


Figure A12. A ground view showing dike construction and clay balls after the dike has achieved a height of about 6 ft

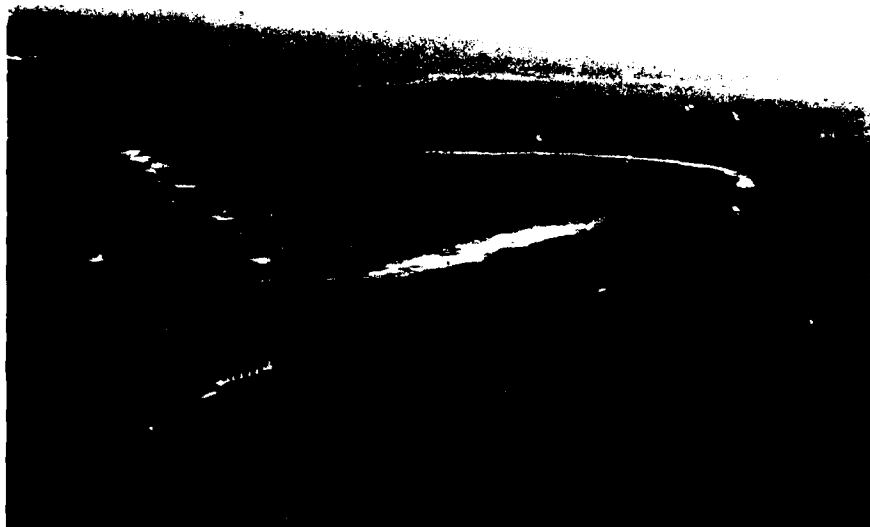


Figure A13. An aerial view looking north showing dike construction during the first pass



Figure A14. A ground view of the dike after the first pass showing the flat natural beaches and the rapid accumulation of drift wood



Figure A15. An experimental vegetation plot planted after the first pass of dredged material



Figure A16. An accumulation of clay balls that stacked up in a mound with 1 on 1 side slopes



Figure A17. A vertical scarp near the shoreline caused by erosion



Figure A18. Clay balls that have dried out above the shoreline



Figure A19. Clay balls embedded with reef shells experience erosion along the shoreline



Figure A20. A very large clay ball that survived through several thousand feet of dredge pipe



Figure A21. Very soft plastic clay ball found along the sandy beaches



Figure A22. Clay balls located away from the shoreline dry out into very hard pieces that are difficult to break

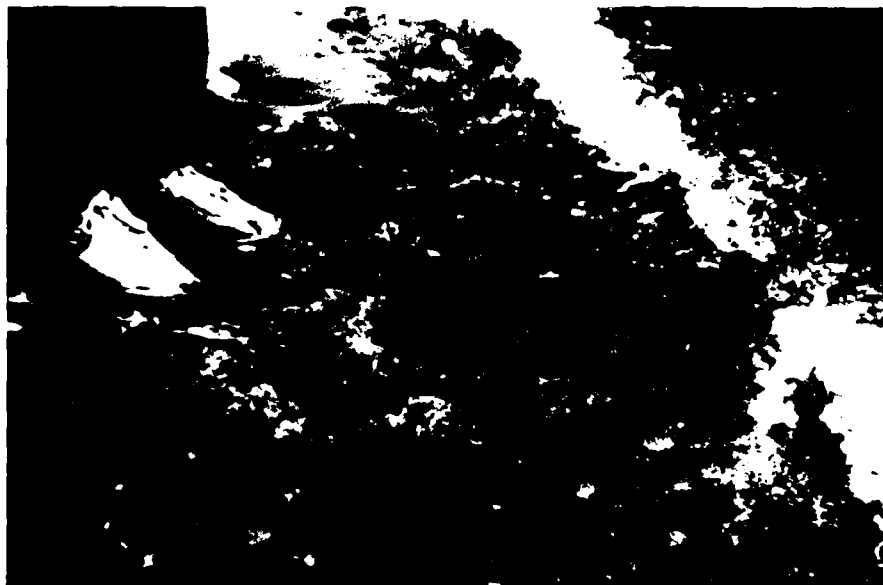


Figure A23. Stiff to very soft clay balls and sand found along the beaches withstand erosion very well

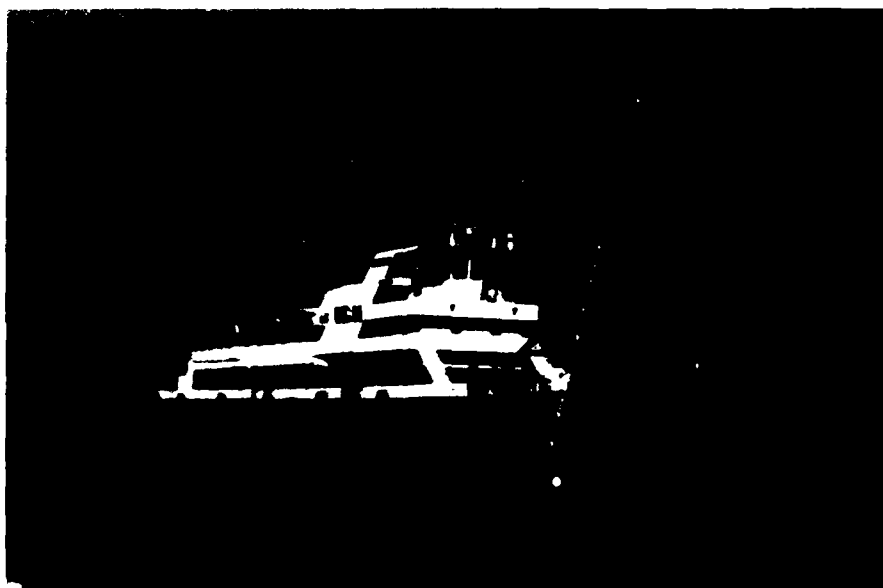


Figure A24. Lenel Bean dust pan dredge that was used to dredge very soft dredged material from the channel



Figure A25. Dust pan dredge depositing dredge material into the southeast corner of Gaillard Island with discharge barge shown in center of photograph



Figure A26. Quality marsh dragline constructing a small dike along the crest of the main dike to prevent dredged material from the dust pan dredge from reentering the channel



Figure A27. Dust pan dredge dumping dredged material into Gaillard Island containment area

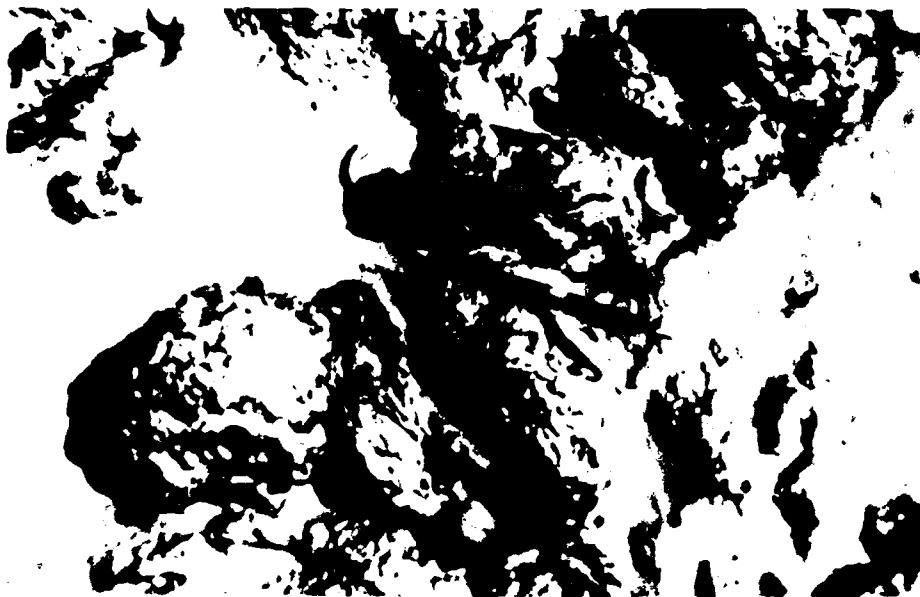


Figure A28. Very soft clay balls dredged by the dust pan dredge



Figures A29. Close-up view of the high pressure water nozzles located in the cutterhead for the dust pan dredge (nozzles were not used on this project)



Figure A30. An infrared aerial view of Gaillard Island looking north two months after construction completed, Mobile Ship Channel located to right of the island

APPENDIX B: DEVELOPMENT OF DATA BASE MANAGEMENT SYSTEM AND DATA COLLECTION PROCEDURES

Introduction

1. When WES began to document the design and construction activities at Theodore Industrial Park on 21 May 1980, the contractor had been working 364 days on a contract that would eventually last for 828 days before completion. The contractor was providing the CE with large volumes of dredging records and survey reports that were difficult to collect and file, and were almost impossible to evaluate and analyze very rapidly. Therefore, the WES devised a very simple method of cataloging the dredging records by transcribing the data into a data base file that could be accessed very easily by a row and column matrix.

Data records provided by the contractor

2. Four daily reports were submitted to the Mobile Area Office by the dredging contractor and one daily report was supplied by the CE inspector. Reports submitted by the contractor consisted of a Dredging Contractor's Daily Inspection or Dredge Operation Report (DOR) (MOB Form 720, Figure B-1); Contractor Operation Report (COR) (MOB Form 4267, Figure B-2); Contractor Inspection Report (CIR) (MOB Form 696, Figure B-3); and during the barge haul operation, the contractor submitted a Drag/Haul Operations Report (Figure B-4). MOB Form 720 was prepared for each of the dredges by survey personnel and approved by each of the dredge boat Captains before being sent to the Dredge Civil Engineer who was located in an office trailer on shore. The Dredge Civil Engineer then prepared an MOB Form 4267 on each dredge and one CIR (MOB Form 696) that summarizes the entire project daily activities, including the barge haul operation reports.

3. All equipment, attendant equipment, personnel, dredges, dredge cut and fill stations, classification of materials being dredged, production rates, time worked, fuel, oil and water, meteorology, etc., are items reported on a daily basis in these reports. To more effectively manage these data, the Theodore Ship Channel Dredging Data Base Management System (DBMS) was developed and these daily records were transcribed into the system. A schematic of the different data files organized for this purpose is shown in a flow chart

in Appendix B, Figure B-5. Each of these categories will be discussed in the following paragraphs.

4. Dredging history file. The dredging history file was initiated by the Mobile District several years ago and information recorded for each dredging contract was used to estimate anticipated future dredge work projects. Information for this file was recorded on 5- by 7-in. cards and kept in the Construction and Operations Division office files. The dredge history file developed for the Theodore Ship Channel DBMS is shown in Figure B-6.

5. Geotechnical data file. Prior to design and construction, an extensive subsurface investigation was conducted by taking borehole soil samples in the land cut and bay cut areas of Theodore Ship Channel and the ship turning basin by the Mobile District drill crew. Borehole samples were also taken along the proposed dike alignment for Gaillard Island. Soil samples were recorded by borehole number, depth, and location, and then were classified before being sent to the soils laboratory for further testing. Because the geotechnical data file was so large it was not shown in this report but is available on magnetic tape files stored at WES. A sample format of the file stored at WES is shown in Figure B-7.

6. Bid schedule results. The bid schedule results for the dredging contract consisted of the Government's estimated cost and a list of the three lowest bid prices for each work item shown in Figure B-8. The lowest bid (\$29,430,910) was submitted by T. L. James Dredging Contractor. After the bids were opened, the low-bid contractor claimed a mathematical error in his bid calculation and submitted a second estimate with the corrected figures. After several months of deliberation, the Mobile District refused to accept the corrected bid. The second lowest bidder was Bean Dredging Corporation with a bid of \$48,971,921. The Mobile District advertised the contract on 6 July 1978, opened the bids on 29 August 1978, but because of the controversy with the lowest bidder, the contractor was not given notice to proceed until 3 May 1979. During this delay, fuel cost began to escalate because of the OPEC fuel crisis in the Middle East. Land cut excavation was bid in at a unit price of \$2.216 per cu yd and the bay cut excavation was bid in at \$0.88 per cu yd.

7. Plant and equipment schedule and attendant plant and equipment. During the early stages of cataloging dredging data, the main plant and equipment was listed in the plant and equipment schedule and attendant plant and

equipment. Figures B-9 and B-10 show a listing of the type information obtained on each plant and major equipment associated with the dredging operation. Collection of this information was too time consuming and was not within the scope of work for this report; therefore, it was agreed between WES and the Mobile District that this part of the DBMS for Gaillard Island would be discontinued for this project. Figures 11 and 12 are the complete data collection format of all dredge operation data that was collected and stored on magnetic tape at WES. It was decided by WES and Mobile that these data were not in the scope of work for this report. The data and program can be used for future projects if it is deemed necessary.

8. Meteorology data. The daily weather was reported on the CIR and these data transcribed into a meteorology data file shown formatted in rows and columns in Figure B-1. These data were taken directly from the Mobile Register newspaper by the Dredge Civil Engineer who was responsible for filling out the CIR. The weather reported in the newspaper comes from a weather station located at Mobile Airport, 10 miles west of Mobile. The CIR's are sequentially numbered and dated from the beginning of the project; all data files are referenced to these numbers. The meteorology data file includes maximum and minimum tidal fluctuations, maximum and minimum temperatures, variation in accumulative precipitation (24 hrs), visibility, sky conditions, wind directions and velocities, and wave heights. Where data are not shown or zeroes appear, data were not reported on the CIR. A note of what the abbreviations at the head of each column stand for is shown on the first page of Figure B-1. A weather classification was assigned by the Dredge Civil Engineer each day, based on the effect the weather may have had on the performance of the contract work. An explanation of these various classifications (A, B, C, D, or others) is shown in Figure B-3.

Hydraulic Excavation

Dredge operations

9. Jim Bean. The dredge Jim Bean began dredging on 29 November 1979, 190 days after the contractor was awarded the contract. During the first 190 days, the contractor was clearing and grubbing, moving buildings, building a work area, surveying, and welding dredge pipe together. Data were transcribed from MOB Form 720 (DOR), MOB Form 4267 (COR), and MOB Form 696 (CIR),

and printed in the format shown in Figure B-2. An explanation of the abbreviations that head each column is shown for each of these tabulations. Tabulation of the data in the format shown was agreed upon by both the WES and Mobile District engineers as the most convenient and useful format to quickly analyze the data. The DOR numbers for each dredge represents the number of days the dredge worked. The Jim Bean dredge was absent from 17 April 1980 to 3 January 1981 when it was sent to Tampa, Florida. The Jim Bean worked a total of 380 days. Most of the columns in the format printed in Figure B-2 are self explanatory.

10. Dave Blackburn. The data base file format for the Dave Blackburn dredge is essentially the same as that written for the Jim Bean and shown tabulated in Figure B-3. DOR No. 1 began on CIR No. 230 or 230 days into the dredging contract. The Dave Blackburn dredge began work on 8 January 1980 and worked on the Theodore project until 28 July 1981 (568 days) moving more dredged material than any of the other dredges during the project.

11. Lenel Bean (dust-pan). The data file for the Lenel Bean dredge was the same as the file for the Jim Bean and Dave Blackburn. The Lenel Bean began dredging on 22 December 1980, 579 days into the contract and completed dredging on 7 May 1981, 139 days later. Records for the Lenel Bean dredge are shown tabulated in Figure B-4.

Mechanical Excavation

Barge haul operation combined

12. Dredging records from two land-based dredges and a floating bucket dredge used in the barge haul operation are shown combined in Figure B-5. All land-based draglines loaded barges-listed as barge type VII; the floating bucket dredge loaded barge type VIII. The barge haul operation began 20 October 1979 on the 132nd day of the contract and worked continuously until 7 August 1980, 310 days later.

DISTRICT Mobile, AL 27" Inch Pipeline Dredge Blackburn
Power, Type Diesel HP 4000

GENERAL DATA

Date or period 8-25-80 Character of work: Maintenance or New Work
Exact location of work: THUNDER SHIP CHANNEL
Average depth (feet and tenths) before dredging: -13'; after dredging: -24'
Character of material and percentage of each: Gravel Sand 20 Clay 75
Mud Silt 5 Hardpan Stone Shell Other
Number of shifts worked per day: 2 Number of persons in crew: 65
Weather: CL / 110° SCATTERED SHOWERS

	TODAY	THIS MONTH	TODATE
NET YARDAGE.....	<u>9586</u>	<u>347,913</u>	<u>4,070,529</u>

ATTENDANT PLANT

ITEM: BUSCON 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
SPILL RT-6, SKIDDER 56, CABLE CRANE, TOW MOUNT, ATTACH

Dredging Ranges Established by Contractor
Type: Poles, Buoys, Fixed, Etc., POLES & BUOYS
Are adequate controls being maintained to provide proper dredge cut and limits of spoil disposal, as reflected in the Special Provisions of the Specifications under paragraph entitled LAYOUT OF WORK? Yes No
Location in reference to Government-established Ranges: 5350' N. of E

DIKES: Elev. Base Crown Number, type and location of Waste Weirs
Are dikes being maintained? ✓ Is all spoil material being retained within diked area?
Dikes constructed this date: Location 98+00 Length in ft.
SPOIL: Designate area being used. SOUTH LEG

SAFETY: Are daily Safety Surveys made of dredge and attendant plant? Yes No
By whom? Name A. GUARDO Title SUPV Deficiencies Noted: None
Deficiencies Corrected:

Verbal Instructions Received: (list any instructions given by Gov't Personnel on deficiencies, etc., with action to be taken.)

Conditions differing in any respect from those indicated upon the Plans or within the Specifications:

Name and Titles of Visitors and their comments on the work:

Name of Contractor: FRAN DENIGER Cont. No: FWO-79-6-0135

CONTRACTOR'S CERTIFICATION: I certify that the above report is complete and correct and that all material and equipment used and work performed during this reporting period were in strict compliance with the Contract Plans and Specifications, except as noted above.

[Signature]
Contractor's Approved Authority's Representative

Figure B1. Dredging contractor's daily inspection report, dredge operation report

CONTRACTOR'S DAILY INSPECTION REPORT <small>(ER 1180-1-6, dtd 30 Jun 66, Part 6)</small>		DATE Thursday- 28 Aug. 1986	REPORT NO. 463
CONTRACT NUMBER AND NAME OF CONTRACTOR C.F.Bean Dredging Corporation DACW01-79-C-0135		DESCRIPTION AND LOCATION OF THE WORK Dredging in bay sta. 210+00 to sta. 274+00 land cut sta. 274+00 to sta. 382+44 dumping with spill barge.	
WEATHER CLASSIFICATION: CLASS A No interruptions of any kind from weather conditions occurring on this or previous shifts. CLASS B Weather occurred during this shift that caused a complete stoppage of all work. CLASS C Weather occurred during this shift that caused a partial stoppage of work. CLASS D Weather overhead excellent or suitable during shift. Work completely stopped due to results of previous adverse weather. CLASS E Weather overhead excellent or suitable during shift but work partially stopped due to previous adverse manner. OTHER Explain.		CLASSIFICATION: CLASS <u>A</u> TEMPERATURE MAX <u>70</u> MIN <u>87</u> PRECIPITATION <u>0.05</u> INCHES	
CONTRACTOR/SUBCONTRACTORS AND AREA OF RESPONSIBILITY FOR WORK PERFORMED TODAY: (Attach list of items of equipment either idle or working as appropriate.) a. C.F.Bean Dredging Corporation-Dredge: Dave Blackburn, Booster: Bean #24, Bean #25, Bean #3, Tugs: Quarter Horse, Chief Corum, Tim Millet, Ken Mar II, Crane Barge, Anchor Barge #22, Anchor #23, A Frame Skidder 560, Anchor #81, Fuel #40, Spill Barge #537, Spill Barge #22, Spud Barge M-508, Deck WFR, Deck TRAC, Deck FMAR, Deck TTAC, KS 522, Equip. D-5 Cat. 3900 Manitowoc, 88-B Pettibone, D-5 Cat Carry All, Crewboat Peter T. b. B) MaHarrey/Houston-Manitowoc 4600 dragline. c. C) Batson Turf Farms-Grassing.			
1. WORK PERFORMED TODAY: (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above.) Established reports, worked on quantities and drawings. Took check section in side disposal area. Spill Barge with Dredge Dave Blackburn dumping on South Leg Phase I Sta. 98+00. Bean #3 in pipe yard loaded on to barge. Took X-Section for Dredge cut. Pipe Yard welded on Bean #3. Worked on rock box.			
2. TYPE AND RESULTS OF INSPECTION: (Indicate whether: P-Preparatory, I-Initial, or F-Follow-up and include satisfactory work completed or deficiencies with action to be taken.) P. Cloudy, winds S. Easterly 6-12, seas 0-3, rough, visibility 10 miles.			
3. TESTS REQUIRED BY PLANS AND/OR SPECIFICATIONS PERFORMED AND RESULTS OF TESTS none			

Sheet 1 of 2

Figure B3. Contractor's daily inspection report

<p>4. VERBAL INSTRUCTIONS RECEIVED: (List any instructions given by Government personnel on construction deficiencies, retesting required, etc. with action to be taken.)</p> <p>none</p>
<p>5. REMARKS: (Cover any conflicts in plans, specifications or instructions, acceptability of incoming materials, offsite surveillance activities, progress of work, delays, causes and extent thereof, days of no work with reasons for same.)</p> <p>Inspector on jobsite Mr. W.J. Brewton, Mr. Ad Dekluiver, Mech. Eng., Mr. G.J. Alber Maint. Mgr. Bean Dredging Corp., on jobsite, Mr. Bob Hutt, Louisiana Dock, on jobsite this date.</p>
<p>6. SAFETY: (Include any infractions of approved safety plan, safety manual or instructions from Government personnel. Specify corrective action taken.)</p> <p>none</p> <div data-bbox="850 1336 1295 1421" style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>INSPECTOR</p> <p><i>Donald J. Barras</i></p> <p>Donald J. Barras, Project Engineer</p> </div>
<p>CONTRACTOR'S CERTIFICATION: I certify that the above report is complete and correct and that all material and equipment used, work performed and tests conducted during this reporting period were in strict compliance with the contract plans and specifications except as noted above.</p> <div data-bbox="776 1542 1239 1642" style="text-align: right; margin-top: 20px;"> <p><i>Donald J. Barras</i></p> <p>Donald J. Barras, Project Engineer</p> <p>CONTRACTOR'S APPROVED AUTHORIZED REPRESENTATIVE</p> </div>

Sheet 2 of 2

Figure B3 (Concluded)

Wsp/Haul Operation
 Job: Thibodeau Ship Channel Job No. 75
 Total Advertised Quantity: 11,559,884 cu. (Load Out)
 Bucket Drag: Remedial 4000 Bucket Size: 600
 Type of Barges: 1) Load Machine 2) Tugs: Type 1: Type 2:
 Week No: From June 9 to June 15 1980

	This week		Previous Weeks		Totals	
	Estimate	Actual	Estimate	Actual	Estimate	Actual
Production Gross	5,110	5,110	1,071,002	1,563,876	1,149,000	1,576,239
Production Paid						
Service Hours	112.25	118.00	4,438.00	4,438.10	4,438.00	4,438.00
Dredging Hours	11.25	30.11	3,115.80	3,115.80	3,115.80	3,115.80
Efficiency			6.00%		6.00%	
Production Per Hour			31.0	20.49	31.0	20.49
Total Number of Loads	100	100	6,129	8,189	6,129	8,189
Average Load per Barge			535	616	535	616
Fuel Used						

General Data	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Specified Delays	This Week	Prev. Weeks	Total
	6-12	6-13	6-14	6-15	6-16	6-17	6-18	6-19	6-20	6-21	6-22	6-23						
Running Time																		
Station to Station																		
Soil Description																		
Digging Depth																		
Loading Time Type 1																		
Loading Time Type 2																		
Sailing Time																		
Unloading Time Type 1																		
Unloading Time Type 2																		
Sailing Distance V.V. In St. M.																		
Number of Loads Type 1																		
Number of Loads Type 2																		
Disposal Location																		
Crane Time																		
Production Gross																		
Production Paid																		

Remarks
1. Shifting Dredge
2. Shifting Anchor
3. Repair Engine Room
4. Repair Deck
5. Repair Bucket
6. Dupont
7. Weather
8. No Barge
9. Tally
10. Tally
11. Tally
12. Tally
13. Tally
14. Changing Wires
15. Miscellaneous
16. TOTALS

One Staff Square, Ship 3108
 New Orleans, Louisiana 70138
 Telephone 504-581-1500
 Telex 160071
 Cable Station

Bean Dredging Corporation

Figure B4. Drag/haul operations report

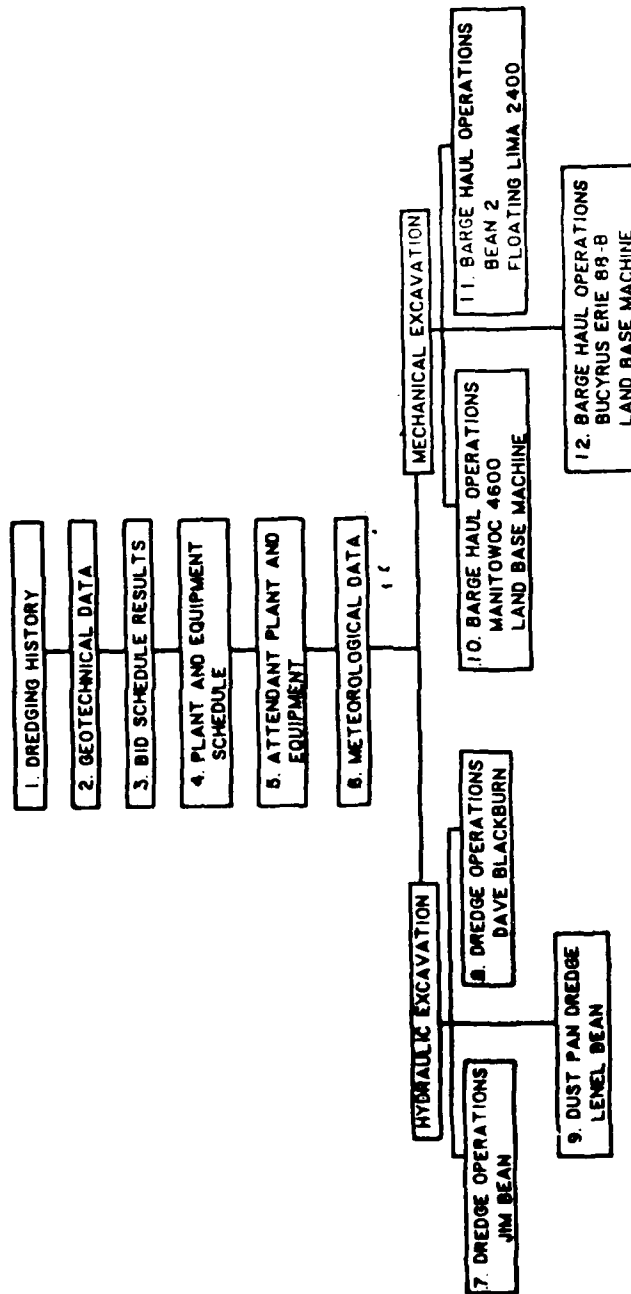


Figure B5. Theodore Ship Channel dredging data base management system

DREDGING HISTORY

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1. DIVISION:	SOUTH ATLANTIC DIVISION	19. TOTAL GOVT COST:	
2. DISTRICT:	MOBILE	20. CONTRIBUTED FUNDS:	
3. AREA OFFICE:	MOBILE AREA OFFICE	21. AUTHORIZED DIMENSIONS	
4. AREA ENGINEER:	PAUL WARREN	WIDTH, FT: 400	
5. PROJECT:	THEODORE SHIP CHANNEL	DEPTH, FT: MLW: -42.0	
	THEODORE INDUSTRIAL PARK	OVERDEPTH: FT: MLW: -44.0	
6. TYPE WORK:	NEW WORK DREDGING	SLOPES: 1:2	
7. GENERAL LOCATION:	THEODORE, ALABAMA		
8. COUNTY:	MOBILE		
9. BID INVITATION NO.:	DACW01-78-E-0099		
10. AMENDMENT NO.:			
11. CONTRACTOR:	BEAN DREDGING CORPORATION		
	ONE SHELL SQUARE		
	SUITE 3700		
	NEW ORLEANS, LA 70139		
	PH: 504-581-1583		
12. CONTRACT NUMBER:	DACW01-79-C-0135		
13. LIQUID DAMAGE			
COST PER DAY:			
14. FINAL PAY ESTIMATE:			
15. CONTRACT PAYMENT:			
16. SUPERVISION AND			
ADM COST:			
17. ENG & DESIGN COST:			
18. LIQUIDATED			
DAMGS ASSED:			

ITEM	DESCRIPTION	DATE
1.	ENVIRO CLEARANCE:	
2.	ADVERTISING DATE:	6 Jul 78
3.	BID OPENING:	29 Aug 78
4.	AWARD:	Mar 79
5.	NOTICE TO PROC:	3 May 79
6.	ACK NOT TO PROC:	NA
7.	COMMENCEMENT:	24 May 79
8.	SCHEDULED COMPL:	Jan 82
9.	ACTUAL COMPL:	28 Aug 81
10.		

Figure B6. Dredge history file

GEOTECHNICAL DATA

BORING HOLE RECORD

CARD SEQ.	RECORD TYPE	CASE ID	HOLE ID	DATE	LOCATION STATION	TOP HOLE DATUM	DEPTH FROM	INTERVAL THICK- NESS	CONSISTENCY	COLOR	CLASSIFICATION USCS
NO.						EL MLW	TOP HOLE	FT			

SHELL	GRAVEL	SAND	SILT	CLAY	SAMPLE ID	DISPOSAL METHOD	SLOPES
-------	--------	------	------	------	--------------	--------------------	--------

TEST SAMPLE RECORD

CARD SEQ.	RECORD TYPE	CASE ID	HOLE ID	SAMPLE ID	DEPTH FROM	CLASSIFICATION USCS	GRAVEL	SAND	FINE	LL	PL	SPECIFIC GRAVITY	NATURAL WATER CONTENT
NO.					TOP HOLE								%

NATURAL DENSITY PCF	DRY DENSITY PCF	COHESION C, PSF	ANGLE INTERNAL FRICTION	PERMEABILITY K, cm/sec	COHESION C _u , PSF
---------------------------	-----------------------	--------------------	-------------------------------	---------------------------	----------------------------------

Figure B7. Format for geotechnical data file

BID SCHEDULE RESULTS

WORK ITEM	ESTIMATED QUANTITY	UNIT	GOVERNMENT ESTIMATE		LOWEST BID		2ND LOWEST BID		3RD LOWEST BID	
			UNIT PRICE \$	ESTIMATED AMOUNT \$	UNIT PRICE \$	ESTIMATED AMOUNT \$	UNIT PRICE \$	ESTIMATED AMOUNT \$	UNIT PRICE \$	ESTIMATED AMOUNT \$
1. MOBILIZATION AND DEMOBILIZATION	1	1		1,622,394		8,000,000		6,000,000		4,250,000
2. CLEARING AND GRUBBING	1			177,810		5,000,000		100,000		1,250,000
3. SEEDING	17.82 acres		630	11,214	700	12,460	1,165	20,737	720	12,816
4. MULCHING	13.82 acres		340	4,692	300	4,140	390	5,382	400	5,520
5. WATERING	125.03 tons		5.2	650	8	1,000	5.20	650	6.00	750
6. LANDCUT EXCAVATION	11,573.000		2.4212	27,921,278	0.88	10,147,160	2.216	25,555,912	2.26	26,062,320
7. BAYCUT EXCAVATION	19,573,000		0.8951	17,519,792	0.55	10,765,150	0.880	17,221,240	1.07	20,943,110
8.										
9.										
10.										
11.										
12.										
TOTAL BID				\$47,257,830		\$29,430,910		\$48,971,921		\$52,524,516

Figure B8. Bid schedule results

PLANT AND EQUIPMENT SCHEDULE

ITEM	EQUIPMENT	NAME	IDENTIFYING NUMBER	INSIDE PIPE DIAM IN.	HORSEPOWER BHP	TYPE OF POWER	ESTIMATED CAPACITY CU YD/MO	DISCHARGE PRESSURE AT PUMP PSI
1	Hydraulic Dredge	Jim Bean	--	27	9200	Diesel	700,000	222-240
2	Hydraulic Dredge	Dave Blackburn	--	27	1750	Diesel	900,000	70-150
3	Dust Pan Dredge	Lenel Bean	--	27	3600	Diesel	1,200,000	26
4	Booster Pump	--	20	27	3600	Diesel	--	200
5	Booster Pump	--	24	27	7200	Diesel	--	250
6	Booster Pump	--	25	27	8000	Diesel	--	290-335
7	Bucket Dredge	Bean 2	Lima 2400	--	--	Diesel	120,000	--
8	Dragline Dredge	Manitowoc	4600	--	--	Diesel	120,000	--
9	Dragline Dredge	Bucyrus Erie	888	--	--	Diesel	120,000	--

ITEM	LENGTH FT	WIDTH FT	CONDITION 1 THRU 10	LOCATION PRIOR TO CONTRACT	LADDER OR BOOM LENGTH FT	CENTRIFUGAL PUMPS ON BOARD	BUCKET CAPACITY CU YD
1	262	65	10	Lampa, FL	140	3	--
2	180	52	7	New Orleans, LA	86	1	--
3	250	40	10	New Orleans, LA	79	*2	--
4	140	40	7	New Orleans, LA	--	2	--
5	140	40	7	New Orleans, LA	--	2	--
6	140	40	10	New Orleans, LA	--	2	--
7	140	40	7	New Orleans, LA	120	--	6
8	--	--	7	New Orleans, LA	120	--	6
9	--	--	7	New Orleans, LA	120	--	6

* New pump

Figure B9. Plant and equipment schedule

ATTENDANT PLANT AND EQUIPMENT (TYPICAL SAMPLE RECORD)

CONTRACTORS INSPECTION REPORT	DATE	MISCELLANEOUS				BARGE HAUL OPERATIONS	
		HOURS WORKED	CLEARING, GRUBBING, AND SEEDING WORK ITEMS 2 THRU 5	HOURS WORKED	LANDCUT ATTENDANT EQUIPMENT ITEMS	WORKED ITEM 6	
274	21 Feb 60	24	Dragline D-6 Dozer dump truck, farm tractor and disc	10	Bean 2 dragline, 6 flat deck barges, spud barge and dragline, 2 tug boats, crew boat		

DREDGE OPERATION REPORT NO.	HOURS WORKED	HYDRAULIC DREDGING OPERATION				REMARKS
		WORK ITEM 7, BAY CUT	WORK ITEM 6 LAND CUT			
85	24	110 Beam Dredge, Booster Pump No. 20, crew boat, survey boat, 2 tug boats, torklift, D-6 dozer, 1 welding machine, spud barge	No Work			Cloudy to fair no adverse conditions
45	24	--				Dave Blackburn Dredge Booster Pump No. 24 and 25 Spill Barge, Tug Boat, Survey Boat A-Frame Crane

Figure B10. Attendant plant and equipment (typical record sample)

7. DREDGE OPERATIONS-JIM BEAN

CONTRACTORS INSPECTION REPORT (CIR)	DREDGE OPERATION REPORT NO.	DATE	DREDGE NAME	CREW MEMBERS			WORK SCHEDULE		DREDGING - STATION - CUT		
				DREDGE	SHORE	OTHER	SHIFTS	DAYS	SIDE	START	STOP
				NO.	NO.	PLANT		PER WK		STA.	STA.

DISPOSAL FILL		CHARACTER OF CUT MATERIAL					TOTAL DAYS WORKED	CHANNEL CONDITION			
FILL START	FILL STOP	CLAY	SAND	SILT	SHELL	GRAVEL		AVERAGE DEPTH		MINIMUM SCUNDING	
STA.	STA.	%	%	%	%	%		BEFORE DREDGING MLW	AFTER DREDGING MLW	BEFORE DREDGING MLW	AFTER DREDGING MLW

WORK PERFORMED												
AVG WIDTH CUT FT	ADVANCE THIS PERIOD FT	FLOATING PIPE FT	SHORE PIPE FT	AVERAGE PUMP SPEED RPM	AMOUNT DREDGED THIS PERIOD CY YD	BANK CUT FT	PONTOONS NO.	PIECES OF PIPE NO.	WIPPLES NO.	ELBOWS NO.	RUBBER LINE FT	HEIGHT OF DISCHARGE FT

DISTRIBUTION OF TIME AND FUEL									
HANDLING PIPE LINES	HANDLING ANCHOR LINE	CLEAN PUMP PIPELINE	CLEAN SUCTION CUTTER	CHANGE LOCATION	OPPOSING NATURAL ELEMENTS	PASSING VESSELS	SHORELINE WORK	BOOSTER	MINOR OPER. REPAIRS

DISTRIBUTION OF TIME AND FUEL (CONTINUED)												REMARKS
PREP. TOW	HOLIDAYS	FIRE DRILL	MISC.	LOST TIME	RUNNING TIME	DREDGE FUEL USED	BOOSTER FUEL USED	BOOSTER FUEL USED	LUBRICANT OIL USED	LUBRICANT GREASE USED	WATER USED	FUEL COST PER GAL

Figure B11. Dredge operations - Jim Bean

9. BARGE HAUL OPERATION - BUCKET DREDGE

CIR	DATE	DREDGE OR DRAGLINE NAME	SERVICE OR RUNNING TIME HR, MIN	DREDGING - STATION			DISPOSAL FILL			CHARACTER OF CUT			DIGGING DEPTH FT
				SIDE OF C	CUT		FILL START STA	FILL STOP STA	CLAY %	SAND %	SILT %		
					START	STOP							

TYPE 1 LOADING TIME HR, MIN	TYPE 2 LOADING TIME HR, MIN	SAILING TIME HR, MIN	TYPE 1 UNLOADING TIME HR, MIN	TYPE 2 UNLOADING TIME HR, MIN	SAILING DISTANCE MILES	TYPE 1 NO. LOADS	TYPE 2 NO. LOADS	PRODUCTION GROSS CU YD	FUEL USED GAL

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SPECIFIED DELAYS				TIME DISTRIBUTION				REMARKS
1. SHIFTING DREDGE HR, MIN	2. SHIFTING ANCHORS HR, MIN	3-5. MISC REPAIRS HR, MIN	7. WEATHER FOG, WIND, SEAS, RAIN HR, MIN	8. NO BARGES HR, MIN	12-15. MISC DELAYS HR, MIN	DREDGING TIME HR, MIN		

Figure B12. Barge haul operation - bucket dredge

Table B1

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WND-S	DIR	CL	X-T	M-T	PREC	W-HGT
1	24MAY79									A	86	72		
2	25MAY79									A	85	70		
3	26MAY79									A	87	69		
4	27MAY79									A	86	70		
5	28MAY79									A	85	72		
6	29MAY79									A	85	71		
7	30MAY79									A	88	69		
8	31MAY79									A	86	70		
9	01JUN79									A	89	76		
10	02JUN79									A	87	71		
11	03JUN79									A	87	71		
12	04JUN79									A	90	76		
13	05JUN79									A	90	74		
14	06JUN79									A	89	73		
15	07JUN79									A	88	74		
16	08JUN79									A	90	72		
17	09JUN79									A	89	74		
18	10JUN79									A	88	73		
19	11JUN79									A	88	74		
20	12JUN79									A	88	74		
21	13JUN79									A	88	74		
22	14JUN79									A	88	74		
23	15JUN79									A	89	74		
24	16JUN79									A	90	75		
25	17JUN79									A	90	75		
26	18JUN79									A	90	75		
27	19JUN79									A	90	75		
28	20JUN79									A	90	74		
29	21JUN79									A	95	75		
30	22JUN79									A	90	75		
31	23JUN79									A	90	75		
32	24JUN79									A	89	74	1.0	
33	25JUN79									A	90	75		
34	26JUN79									A	90	75		
35	27JUN79									A	90	75		
36	28JUN79									A	90	75		
37	29JUN79									A	90	75	1.0	
38	30JUN79									A	95	75		

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
39	01JUL79		0		0					A	90	75		
40	02JUL79		0		0					A	92	75		
41	03JUL79		0		0					A	95	75		
42	04JUL79		0		0					A	95	75		
43	05JUL79		0		0					A	95	75		
44	06JUL79		0		0					A	95	75		
45	07JUL79		0		0					A	90	75	0.5	
46	08JUL79		0		0					A	90	75	1.0	
47	09JUL79		0		0					C	80	75	1.0	
48	10JUL79		0		0					C	82	76	0.5	
49	10JUL79		0		0					B	80	72	2.0	
50	10JUL79		0		0					C	81	74	1.0	
51	10JUL79		0		0					E	90	76	TR	
52	10JUL79		0		0					BE	92	80	1.0	
53	10JUL79		0		0					BE	90	80	1.0	
54	10JUL79		0		0					BE	90	80	0.25	
55	10JUL79		0		0					CE	89	80	0.15	
56	10JUL79		0		0					BE	88	79	0.50	
57	10JUL79		0		0					BE	86	76	1.0	
58	20JUL79		0		0					BE	85	74	0.5	
59	20JUL79		0		0					E	95	78	0	
60	20JUL79		0		0					CE	95	75	0.25	
61	20JUL79		0		0					BE	83	72	1.25	
62	20JUL79		0		0					CE	86	73	0.25	
63	20JUL79		0		0					E	88	74	TR	
64	20JUL79		0		0					E	85	76	TR	
65	20JUL79		0		0					E	86	76	0	
66	20JUL79		0		0					E	90	75	0	
67	20JUL79		0		0					E	95	74	0	
68	30JUL79		0		0					A	90	75	0	
69	31JUL79		0		0					A	92	76	0	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIR	WND-S	DIR	CL	X-T	M-T	PREC	W-HGT
70	01AUG79			0		0				A	94	74	0	
71	01AUG79			0		0				A	95	75	0	
72	01AUG79			0		0				A	90	75	0	
73	01AUG79			0		0					0	0		
74	01AUG79			0		0					0	0		
75	01AUG79			0		0					0	0		
76	01AUG79			0		0				A	93	72	0	
77	01AUG79			0		0				A	93	74	0	
78	01AUG79			0		0				A	93	73	0	
79	10AUG79			0		0				A	93	74	0	
80	10AUG79			0		0				A	91	72	0.5	
81	10AUG79			0		0				A	94	75	0	
82	10AUG79			0		0				A	92	72	0	
83	10AUG79			0		0				A	93	72	0	
84	10AUG79			0		0				A	90	71	0	
85	10AUG79			0		0				A	89	70	0	
86	10AUG79			0		0				A	90	70	0	
87	10AUG79			0		0				A	89	69	0	
88	10AUG79			0		0				A	89	70	0	
89	20AUG79			0		0				A	90	72	0	
90	21AUG79			0		0				A	91	70	0	
91	22AUG79			0		0				A	90	69	TR	
92	23AUG79			0		0		V		C	91	72	0.25	
93	24AUG79			0		0		V		C	90	71	0.48	
94	25AUG79			0		0		V		C	87	71	0.13	
95	26AUG79			0		0				C	81	72	1.64	
96	27AUG79			0		0				C	79	72	0.10	
97	28AUG79			0		0				C	89	73	TR	
98	29AUG79			0		0				C	90	72	TR	
99	30AUG79			0		0				C	92	73	0.17	
100	31AUG79			0		0				C	91	74	TR	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
101	01SEP79		0		0	PCY				C	89	72	1.26	
102	02SEP79		0		0	PCY				C	87	74	0.07	
103	03SEP79		0		0	PCY				C	88	72	0.12	
104	04SEP79		0		0	PCY				C	89	70	0	
105	05SEP79		0		0	PCY				C	91	72	0	
106	06SEP79		0		0	PCY				C	92	70	0	
107	07SEP79		0		0						0	0		
108	08SEP79		0		0	PCY				C	90	72	0	
109	09SEP79		0		0	PCY				C	91	72	0	
110	10SEP79		0		0	C				C	92	70	0	
111	11SEP79		0		0	PC				C	91	70	TR	
112	12SEP79		0		0	CL				S	88	72	0.10	
113	13SEP79		0		0	PC				D	80	70	TR	
114	14SEP79		0		0						0	0		
115	15SEP79		0		0	PC				E	90	70	0.12	
116	16SEP79		0		0	PCY-R				E	90	70	0	
117	17SEP79		0		0	C				E	90	70	0	
118	18SEP79		0		0	C				E	91	70	0	
119	19SEP79		0		0	C				E	90	70	0	
120	20SEP79		0		0	PCY-R				E	85	70	TR	
121	21SEP79		0		0	PCY-R				E	85	70	0.12	
122	22SEP79		0		0	C				E	86	70	0	
123	23SEP79		0		0	PCY				E	75	65	0	
124	24SEP79		0		0	PCY				E	70	60	0	
125	25SEP79		0		0	PCY				E	70	60	0	
126	26SEP79		0		0	PCY				E	75	70	0	
127	27SEP79		0		0	PCY				E	77	72	TR	
128	28SEP79		0		0	PCY				E	78	73	0	
129	29SEP79		0		0	C				E	85	65	0	
130	30SEP79		0		0	C				F	87	66	0	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
131	01OCT79			0		0 C				E	85	65	0	
132	02OCT79			0		0 C				E	87	65	0	
133	03OCT79			0		0 C				E	88	71	0	
134	04OCT79			0		0 PC				E	87	72	TR	
135	05OCT79			0		0 C				E	87	49	0	
136	06OCT79			0		0 C				E	85	57	0	
137	07OCT79			0		0 C				E	83	52	0	
138	08OCT79			0		0 F				C	82	57	0	
139	09OCT79			0		0 C				C	82	57	0	
140	10OCT79			0		0 C				C	75	52	0	
141	11OCT79			0		0 C				C	75	50	0	
142	12OCT79			0		0 C				C	77	58	0	
143	12OCT79			0		0 C				C	79	57	0	
144	12OCT79			0		0 C				C	76	60	0	
145	12OCT79			0		0 C				C	79	59	0	
146	12OCT79			0		0 C				C	79	63	0	
147	12OCT79			0		0 C				C	82	68	0	
148	12OCT79			0		0 C				C	84	69	0	
149	12OCT79			0		0 C				C	87	67	0	
150	20OCT79			0		0 C				C	85	68	0	
151	20OCT79			0		0 C				C	84	69	0	
152	20OCT79			0		0 CY				C	85	67	0	
153	20OCT79			0		0 C				C	69	43	0	
154	20OCT79			0		0 C				C	69	46	0	
155	20OCT79			0		0 C				C	67	43	0	
156	20OCT79			0		0 C				C	83	69	0	
157	20OCT79			0		0 C				C	80	71	0	
158	20OCT79			0		0 C				C	84	72	0	
159	29OCT79			0		0 C				C	87	65	0	
160	30OCT79			0		0 CY				C	84	72	0	
161	31OCT79			0		0 R				C	77	62	2.8	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
162	01NOV79		0		0	P				C	62	43	2.13	
163	02NOV79		0		0	C				C	69	53	0	
164	03NOV79		0		0	C				C	67	49	0	
165	04NOV79		0		0	C				A	66	47	0	
166	05NOV79		0		0	C				C	70	44	0	
167	06NOV79		0		0	C				C	71	42	0	
168	07NOV79		0		0	C				C	70	48	0	
169	08NOV79		0		0	C				C	73	46	0	
170	09NOV79		0		0	CY				A	70	40	0	
171	10NOV79		0		0	CY				A	65	40	1.8	
172	11NOV79		0		0	CY				A	66	43	0	
173	12NOV79		0		0	C				A	65	42	0	
174	13NOV79		0		0	C				A	65	38	0	
175	14NOV79		0		0	C				A	61	37	0	
176	15NOV79		0		0	C				A	61	36	0	
177	16NOV79		0		0	C				A	64	36	0	
178	17NOV79		0		0	C				A	64	40	0	
179	18NOV79		0		0	C				A	70	40	0	
180	19NOV79		0		0	C - F				A	83	62	0	
181	20NOV79		0		0	C - F				A	79	59	0	
182	21NOV79		0		0	C				A	75	62	0	
183	22NOV79		0		0	C - CY				A	79	62	0	
184	23NOV79		0		0	CY-R				A	62	44	1.03	
185	24NOV79		0		0	CY-R				C	69	53	1.08	
186	25NOV79		0		0	CY-R				C	50	40	1.05	
187	26NOV79		0		0	C				A	75	50	0	
188	27NOV79		0		0	C				A	75	40	0	
189	28NOV79		0		0	C				A	50	32	TR	
190	29NOV79	0	800	0.5	2200	C	5	15	NNE	A	52	32	0	
191	30NOV79	0	800	0.5	2000	C	15	5	NNE	A	57	30	0	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIR	WND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
192	01DEC79	1.0	800	0.0	1800	C	15	5-8	N	A	54	26	0	
193	02DEC79	- .6	800	0.0	1800	C	15	5-10	NNE	A	57	37	0	
194	03DEC79	- 1.0	800	- 0.2	1800	CY	15	10	NNE	A	54	31	0	
195	04DEC79	- 0.5	700	+ 1.5	2300	C	15	5	NNE	A	65	30	0	
196	05DEC79	+ 0.5	1200	+ 1.2	400	C	10			A	70	35	0	
197	06DEC79	0.0	300	+ 0.8	1500	CY-R	0-2			C	64	57	TR	
198	07DEC79	+ .1	800	+ .4	1600	C	U/L	5-10	NNE	A	50	35	0	
199	08DEC79	+ .4	800	.0	1600	C	U/L			A	64	44	0	
200	09DEC79		0		0	C	U/L	5-10	NNE	A	64	44	0	
201	10DEC79		0		0	C	10	5-8	NNE	C	65	47	0	
202	11DEC79		0		0	C-F	10	2-8	VAR	C	65	47	0	
203	12DEC79		0		0	PCY-F	5	2-8	VAR	C	70	45	TR	
204	13DEC79		0		0	F-R	0	2-5	SE	C	74	60	1.04	
205	14DEC79	.0	700	+ 1.0	1600	CY-R	5	15-20	NNE	C	50	40	TR	
206	15DEC79	+ 0.4	1900	+ 1.5	700	CY-R	0	15-20	NNE	C	50	35	1.07	
207	16DEC79		0		0	CY-R	5	10-15	NNE	C	50	35	TR	
208	17DEC79	- 1.2	800		0	C	12	15-20	N	A	45	32	0	
209	18DEC79		0		0	C	12	1-4	NE	A	50	22	0	
210	19DEC79		0		0	PCY	5	1-4	NE	A	57	29	0	
211	20DEC79		0		0	C	4	1-4	NE	A	60	36	0	
212	21DEC79		0		0	C	4	5-10	NNE	A	63	42	0	
213	22DEC79		0		0	PCY	4	4-8	NE	A	58	52	0	
214	23DEC79		0		0	CY-R	5	10-20	SSE	A	35	60	0	
215	24DEC79		0		0	C	5	2-6	SSE	A	35	55	0	
216	25DEC79		0		0	C	6	5-10	W	A	35	55	0	
217	26DEC79		0		0	C	10	2-6	NE	A	60	35	0	
218	27DEC79		0		0	CY	10	2-4	NE	A	65	33	0	
219	28DEC79		0		0	C	10	2-6	ENE	A	60	42	0	
220	29DEC79		0		0	CY	8	2-6	ENE	A	65	45	TR	
221	30DEC79		0		0	CY	10	10-15	NW	A	55	46	0	
222	31DEC79		0		0	C	10	12-15	NW	A	58	45	0	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIR	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
223	01JAN80					0 C	10	2-6	ENE	A	53	35	0	
224	02JAN80					0 C	10	2-6	ENE	A	55	35	0	
225	03JAN80					0 PCY	10	4-8	E	A	55	35	0	
226	04JAN80					0 CY	10	15-20	NW	A	55	35	0	
227	05JAN80					0 CY	10	15-20	NW	A	55	35	0	
228	06JAN80					0 CY	10	12-18	ESE	A	55	30	0	
229	07JAN80					0 CY-F	4	8-10	ESE	A	55	68	0.26	
230	08JAN80					0 F	1	5-10	VAR	A	60	50	01	
231	09JAN80					0 F	2	5-10	ESE	C	65	52	0	
232	10JAN80					0 CY-F	0-3	8-12	VAR	C	68	50	TR	
233	11JAN80					0 CY-F-R	0-6	15-20	VAR	C	69	62	1.78	
234	12JAN80					0 CY	10	5-15	N	A	51	47	0	
235	13JAN80					0 CY	2	5-15	NNE	A	61	53	0	
236	14JAN80					0 CY	10	6-12	E	A	62	51	0	
237	15JAN80					0 PCY	10	5-10	NE	A	71	48	0	
238	16JAN80					0 CY-R	5	8-14	SE	C	66	58	.13	
239	17JAN80					0 CY-F-R	1	8-14	SE	C	70	64	1.07	
240	18JAN80					0 CY-F	0-5	3-12	VAR	A	73	62	.01	
241	19JAN80					0 CY	10	8-14	ENE	A	74	51	0	
242	20JAN80					0 CY-F	0-10	8-14	E	A	75	49	0	
243	21JAN80					0 CY-F	0-10	5-10	NE	A	67	53	0	
244	22JAN80					0 CY-F	0-8	6-12	SSE	C	72	63	0.40	
245	23JAN80					0 CY	10	10-16	NW	A	51	41	0	
246	24JAN80					0 C	10	8-14	WSW	A	60	34	0	
247	25JAN80					0 CY	0-10	12-18	SW	C	61	53	TR	
248	26JAN80					0 CY-F-R	0	6-12	SE	C	61	56	0.61	
249	27JAN80					0 CY	10	6-12	NW	A	60	45	0	
250	28JAN80					0 CY	10	6-12	NE	A	60	47	0	
251	29JAN80					0 CY	10	6-12	E	A	66	46	0	
252	30JAN80					0 PCY	2-10	6-12	E	A	72	45	0	
253	31JAN80					0 PCY-R	10	10-20	NW	A	66	46	.33	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
254	01FEB80		0		0	PCY	10	8-16	N	A	42	25	0	
255	02FEB80		0		0	PCY	10	5-10	NE	A	42	24	0	
256	03FEB80		0		0	PCY	10	3-6	NE	A	53	30	0	
257	04FEB80		0		0	PCY	10	3-6	NE	A	53	31	0	
258	05FEB80		0		0	CY-R	10	8-12	SE	C	60	34	.02	
259	06FEB80		0		0	PCY	10	8-10	NW	A	56	42	.54	
260	07FEB80		0		0	PCY	10	10-12	NE	A	51	28	0	
261	08FEB80		0		0	CY	10	8-14	N	A	59	37	0	
262	09FEB80		0		0	CY-F	0.25	6-16	N	A	62	50	.54	
263	10FEB80		0		0	PCY-R	10	6-12	NNW	A	43	35	.01	
264	11FEB80		0		0	CY	10	6-12	NW	A	50	26	0	
265	12FEB80		0		0	CY	10	5-10	N	A	49	36	0	
266	13FEB80		0		0	CY	0-5	5-10	E	A	50	41	0	
267	14FEB80		0		0	CY	5-10	10-15	S	A	67	42	0	
268	15FEB80		0		0	CY	0-5	10-15	S	A	71	46	TR	
269	16FEB80		0		0	CY-R	0-5	15-25	NW	C	60	40	1.0	
270	17FEB80		0		0	PCY-R	5-10	15-20	NW	C	46	25	.01	
271	18FEB80		0		0	PCY	10	5-10	SE	A	54	26	0	
272	19FEB80		0		0	PCY	0-6	7-14	SE	A	62	42	0	
273	20FEB80		0		0	CY	0-8	8-14	S	A	74	57	0	
274	21FEB80		0		0	CY-F	0-2	8-16	S	C	73	60	TR	
275	22FEB80		0		0	CY-F	0-1	8-12	S	C	72	67	.05	
276	23FEB80		0		0	CY-F	0-2	5-10	SW	C	81	62	0	
277	24FEB80		0		0	CY-F	0-5	5-10	SW	C	75	62	0	
278	25FEB80		0		0	C	0-10	15-30	NW	C	66	53	0	
279	26FEB80		0		0	C	0-10	15-20	NW	C	50	32	0	
280	27FEB80		0		0	PCY	0-8	5-15	SW	C	61	32	0	
281	28FEB80		0		0	PCY	0-8	8-14	SW	C	71	45	0	
282	29FEB80		0		0	PCY	0-8	5-15	SW	C	73	53	0	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRCP	M-HGT
283	01MAR80		0			0 PCY	0-15	10-25	NW	C	67	38		
284	02MAR80		0			0 C	0-15	10-20	N	C	40	23	0	
285	03MAR80		0			0 C	0-15	8-15	S	A	55	23	0	
286	04MAR80		0			0 PCY	0-10	8-15	ENE	C	62	36	0	
287	05MAR80		0			0 CY-R	0-10	10-18	NW	A	80	62	.43	
288	06MAR80		0			0 CY-F	0-8	8-15	NE	C	76	46	0	
289	07MAR80		0			0 CY-F-R	0-5	8-14	ESE	C	72	63	.20	
290	08MAR80		0			0 CY-F-R	0-5	8-18	S	C	83	71	.15	
291	09MAR80		0			0 CY-F-R	0-10	10-15	S	C	75	65	.08	
292	10MAR80		0			0 CY-F-R	0-5	10-20	NW	C	83	66	.14	
293	11MAR80		0			0 CY-F	0-8	8-16	NE	C	77	62	0	
294	12MAR80		0			0 CY-F-R	0-6	10-20	S	C	76	66	.20	
295	13MAR80		0			0 PCY	10-15	10-20	NW	C	85	64	0	
296	14MAR80		0			0 C	10	6-12	N	C	85	64	0	
297	15MAR80		0			0 PCY	10	10-15	SW	C	73	53	0	
298	16MAR80		0			0 PCY	10	10-25	SW	A	72	55	0	
299	17MAR80		0			0 CY-R	0-10	12-15	S	C	76	64	2.8	
300	18MAR80		0			0 PCY	10	10-18	N	C	65	46	0	
301	19MAR80		0			0 CY-R	0-10	10-15	SE	C	70	48	.05	
302	20MAR80		0			0 CY-F-R	0-2	10-20	S	C	79	62	.08	
303	21MAR80		0			0 CY-R	2-10	12-20	NW	C	72	55	.47	
304	22MAR80		0			0 PCY	4-10	10-20	SE	C	77	47	0	
305	23MAR80		0			0 PCY	4-10	10-20	SE	C	77	47	0	
306	24MAR80		0			0 PCY-R	10	12-20	S	C	84	62	.04	
307	25MAR80		0			0 PCY	5	5-10	ESE	A	72	46	0	
308	26MAR80		0			0 CY-R	10	5-15	E	C	60	54	.63	
309	27MAR80		0			0 CY	0-10	5-15	SE	C	66	55	0	
310	28MAR80		0			0 CY-R	0-2	5-15	E	C	58	52	4.0	
311	29MAR80		0			0 CY-R	2	8-16	S	C	56	60	.81	
312	30MAR80		0			0 CY-R	10	8-16	S	C	71	58	1.40	
313	31MAR80		0			0 C	10	6-12	W	C	71	50	0	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRFCP	W-HGT
314	01APR80					0	C	10	5-10	E	A	72	50	0
315	02APR80					0	CY-R	0-3	7-14	VAR	C	62	57	2.16
316	03APR80					0	CY-R-F	8	6-14	SW	C	70	60	1.09
317	04APR80					0	PCY-R	8	8-14	NW	A	75	66	.08
318	05APR80					0	PCY	10	6-12	NW	A	70	47	0
319	06APR80					0	PCY	10	7-14	SE	A	72	49	0
320	07APR80					0	CY-R	3-8	7-14	SE	C	71	61	.32
321	08APR80					0	CY	10	8-15	S	C	85	67	.79
322	09APR80					0	PCY	10	6-16	VAR	C	80	54	0
323	10APR80					0	C	10	6-12	S	A	84	52	0
324	11APR80					0	CY-R	1-7	10-20	S	C	78	58	.10
325	12APR80					0	CY-R	0-5	10-20	S	C	69	58	2.52
326	13APR80					0	CY-R	0-8	15-30	S	C	71	61	7.88
327	14APR80					0	PCY	10	8-12	W	C	61	44	0
328	15APR80					0	C	10	8-16	W	A	73	50	0
329	16APR80					0	C	10	8-12	S	A	75	45	0
330	17APR80					0	C	10	5-10	ESE	A	77	48	0
331	18APR80					0	CY-R	0-8	8-14	SE	C	68	53	.89
332	19APR80	+ 0.1	600	+ 2.4	1400	0	PCY	10	6-12	E	C	75	56	0
333	20APR80	+ 0.6	100	+ 2.0	1400	0	C	0-10	5-10	NE	A	82	55	0
334	21APR80	+ 0.5	500	+ 2.0	1730	0	C	10	LIGHT	VAR	A	88	58	0
335	22APR80	+ 0.6	500	+ 1.8	1400	0	C	10	LIGHT	VAR	A	89	52	0
336	23APR80	+ 0.5	500	+ 1.8	1700	0	C	10	5-10	SE	A	87	63	0
337	24APR80	+ 1.0	700	+ 1.7	2000	0	C	10	5-10	SE	A	82	58	0
338	25APR80					0	PCY	10	10-18	S	A	82	64	0
339	26APR80					0	PCY	10	10-20	S	A	84	68	.60
340	27APR80					0	PCY	10	10-18	NW	A	70	58	0
341	28APR80					0	PCY	10	10-16	NW	A	74	50	0
342	29APR80	+ 0.8	0	+ 1.6	1100	0	PCY	10	10-16	NW	A	82	57	0
343	30APR80	+ 0.8	100	+ 1.1	430	0	PCY	10	8-12	SE	A	81	61	0

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECP	W-HGT
344	01MAY80	+ 0.7	2200	+ 1.7	900	PCY-F	10	8-12	SE	A	79	65	0	
345	02MAY80	+ 0.8	100	+ 2.0	1400	CY	0-8	10	SE	A	81	61	0.58	
346	03MAY80	+ 0.5	100	+ 2.0	1400	PCY-R	0-8	0-15	NE	A	81	63	1.0	
347	04MAY80	+ 0.5	100	+ 1.4	1700	PCY	0-6	0-5	E	A	81	60	0	
348	05MAY80	+ 0.6	0	+ 1.9	1700	PCY	0-5	LIGHT	VAR	A	83	56	0	
349	06MAY80	+ 0.3	500	+ 1.9	1800	PCY-F	2-10	4-10	NW	A	88	60	0	
350	07MAY80	+ 0.4	800	+ 2.0	1600	PCY-F	2-10	8-20	SE	A	85	67	0	
351	08MAY80	+ 0.8	400	+ 1.9	1800	PCY	0-10	5-15	SW	C	84	66	0.11	
352	09MAY80	+ 0.5	500	+ 1.7	1700	PCY	0-10	4-12	N	C	80	59	.11	
353	10MAY80	+ 0.7	500	+ 1.6	1300	PCY	0-10	5-15		A	80	55	0	
354	11MAY80	+ .8	1900	+ 1.5	0	PCY	0-10	6-12		A	80	57	0	
355	12MAY80	+ 1.1	1600	+ 1.6	1100	PCY	10	10-20	S	A	86	69	0	
356	13MAY80	+ 0.4	2200	+ 2.1	1000	CY	10	12-22	S	A	80	70	.03	
357	14MAY80	+ .5	0	+ 2.1	1200	CY	10	8-15	SW	A	81	72	.54	
358	15MAY80	+ 0.4	100	+ 1.7	700	CY	0-8	8-20	SE	C	80	68	.30	
359	16MAY80	+ 1.0	600	+ 2.5	0	CY	0-4	12-25	VAR	C	76	68	2.90	
360	17MAY80	+ 1.2	100	+ 2.2	700	CY	0-4	15-25	VAR	C	76	66	6.08	
361	18MAY80	+ 0.8	100	+ 1.5	1700	CY	2-6	6-12	S	C	84	65	.05	
362	19MAY80	+ 0.8	300	+ 2.1	1400	CY	0-8	5-10	S	C	81	68	0.43	
363	20MAY80	+ 1.1	500	+ 2.0	2400	PCY-R	0-8	6-12	SW	A	84	67	1.55	
364	21MAY80	+ 0.5	500	+ 1.7	2200	PCY	0-10	6-15	VAR	A	85	64	0	
365	22MAY80	+ 0.8	600	+ 1.8	900	PCY	0-10	5-15	SE	A	84	67	0.06	
366	23MAY80	+ 1.3	200	+ 2.0	1700	PCY	10	4-12	SW	C	84	69	0.14	
367	24MAY80	+ 1.4	1800	+ 1.8	1100	PCY	10	5-10	SW	A	89	68	0	
368	25MAY80	+ 1.5	1500	+ 1.2	900	PCY	0-10	5-10	SW	C	93	70	0	
369	26MAY80	+ 1.2	1600	+ 1.5	1900	PCY	0-10	6-12	SE	A	89	66	0.92	
370	27MAY80	+ 1.2	1200	+ 1.8	2400	PCY	10	6-12	NE	A	87	69	0	
371	28MAY80	+ 0.3	2200	+ 2.2	900	PCY	10	6-12	SE	A	88	70	0	
372	29MAY80	+ 0.9	2200	+ 2.5	1200	PCY	10	6-12	S	A	86	68	0	
373	30MAY80	+ 1.0	2200	+ 2.0	1300	PCY	10	5-10	S	A	86	67	0	
374	31MAY80	+ 1.0	2200	+ 2.6	1100	PCY	10	10-15	S	A	88	67	0	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIP	CL	X-T	M-T	PRECIP	W-HGT
375	01JUN80		0											
376	02JUN80	+ 0.9	1200	+ 2.5	1700	PCY	10	8-14	S	A	88	68	0	
377	03JUN80	+ 0.9	300	+ 2.4	1200	PCY	10	6-12	S	A	86	68	0	
378	04JUN80	+ 0.9	300	+ 2.4	1500	PCY	10	8-15	SE	A	90	67	0	
379	05JUN80	+ 0.9	2400	+ 1.9	1800	PCY	10	6-10	S	A	93	66	0	
380	06JUN80	+ 0.8	400	+ 1.6	1300	PCY	10	5-10	S	A	93	70	0	
381	07JUN80	+ 0.9	300	+ 1.6	1000	PCY	10	7-14	S	A	93	71	0	
382	08JUN80	+ 0.7	2200	+ 1.6	100	PCY-R	10	8-16	S	A	93	74	0	
383	09JUN80	+ 0.8	300	+ 8.0	2200	PCY	10	8-16	SW	A	96	76	0.03	
384	10JUN80	+ 1.0	2400	+ 1.1	300	PCY	10	6-12	NE	A	83	69	0.02	
385	11JUN80	0.0	2400	+ 1.2	600	PCY	10	8-10	N	A	89	60	0	
386	12JUN80	0.0	2400	+ 1.9	1000	PCY	10	2-6	NE	A	93	64	0	
387	13JUN80	0.0	2400	+ 2.1	1100	PCY	10	5-15	E	A	94	66	0	
388	14JUN80	+ 0.7	330	+ 1.9	830	PCY	15	5-10	SE	A	94	66	0	
389	15JUN80	+ 0.5	1200	+ 1.4	700	PCY	10	5-10	S	A	91	71	0	
390	16JUN80	+ 0.6	1200	+ 2.6	1500	PCY	10	5-10	S	A	92	73	0	
391	17JUN80	+ 0.5	200	+ 2.0	1400	PCY	10	10-15	SE	A	92	68	0	
392	18JUN80	+ 0.7	100	+ 1.9	1600	PCY	10	5-15	SW	A	95	70	0	
393	19JUN80	+ 0.8	100	+ 1.9	1700	PCY-R	10	5-15	SW	A	93	75	0.26	
394	20JUN80	+ 0.8	200	+ 1.3	1200	PCY	0-10	4-12	VAR	C	94	72	1.41	
395	21JUN80	+ 0.8	400	+ 1.8	1000	PCY	10	5-15	SW	A	90	71	0.02	
396	22JUN80	0.7	100	1.5	1100	PCY	10	5-10	SE	A	93	76	0	
397	23JUN80	+ 0.4	2000	+ 1.9	800	PCY	10	5-10	S	A	93	73	0.02	
398	24JUN80	+ 0.5	2200	+ 8.0	1800	PCY	0-10	5-10	S	A	89	73	0.55	
399	25JUN80	+ 0.7	1100	+ 1.2	1500	PCY	0-10	15-20	SNW	C	90	72	0.30	
400	26JUN80	+ 0.1	1900	+ 2.0	1000	PCY	0-10	10-15	SW	A	89	79	0.02	
401	27JUN80		0				10	6-10	W	A	90	78	0	
402	28JUN80	+ 0.1	0	+ 1.5	1630	PCY	10	4-12	SW	A	90	76	0.01	
403	29JUN80	+ 0.4	0	+ 2.5	0	PCY	10	4-12	S	A	91	73	0.01	
404	30JUN80	+ 0.4	0	+ 1.9	1300	PCY	10	8-14	S	A	93	76	0	
							10	7-14	SW	A	96	79	0	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
405	01JUL80	0.0	0	+ 1.4	1100	PCY	10	6-10	VAR	A	98	77	0	
406	02JUL80	0.0	300	+ 1.2	1400	C	10	10	VAR	A	94	76	0	
407	03JUL80		0		0	C	10	5-10	SE	A	95	76	0	
408	04JUL80	+ 1.3	0	+ 1.4	0	C	10	6-12	SW	A	94	75	0	
409	05JUL80	+ 0.6	0	+ 1.6	1000	C	12	6-12	SW	A	96	76	0	
410	06JUL80	+ 1.0	9100	+ 1.5	1100	C	12	5-10	SW	A	98	75	0	
411	07JUL80		0		0						0	0	0	
412	08JUL80		0		0						0	0	0	
413	09JUL80		0		0						0	0	0	
414	10JUL80		0		0						0	0	0	
415	11JUL80		0		0						0	0	0	
416	12JUL80		0		0						0	0	0	
417	13JUL80		0		0						0	0	0	
418	14JUL80		0		0						0	0	0	
419	15JUL80		0		0						0	0	0	
420	16JUL80		0		0						0	0	0	
421	17JUL80		0		0						0	0	0	
422	18JUL80		0		0						0	0	0	
423	19JUL80		0		0						0	0	0	
424	20JUL80		0		0	PCY-R	10	7-14	SE	A	82	75	1.29	
425	21JUL80		0		0	PCY-R	8	8-16	S	A	85	74	0.57	
426	22JUL80		0		0	PCY-R	10	5-15	S	A	86	74	0.48	
427	23JUL80		0		0	PCY-R	8	8-15	SW	C	81	74	0.86	
428	24JUL80		0		0	PCY	10	8-15	SW	A	90	74	0	
429	25JUL80		0		0	PCY	8	5-10	S	A	92	82	0	
430	26JUL80		0		0	PCY	10		ESE	A	86	75	0	
431	27JUL80		0		0	PCY-R	10	6-12	SW	A	92	75	0.53	
432	28JUL80		0		0	CY-R	8	6-12	W	C	86	73	0.39	
433	29JUL80		0		0	PCY-R	10	5-10	NW	C	92	73	0.17	
434	30JUL80		0		0	C	10	5-10	W	A	94	73	0	
435	31JUL80		0		0	C-R	10	5-10	SW	A	92	75	0.29	

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
436	01AUG80		0		0	C	10	6-10	SW	A	91	74	0	
437	02AUG80		0		0	C	10	5-10	S	A	92	74	0	
438	03AUG80		0		0	PCY-R	10	3-16	SW	C	92	74	0.35	
439	04AUG80		0		0	C	10	8-16	S	A	92	74	0	
440	05AUG80		0		0	C	10	4-12	S	A	93	75	0	
441	06AUG80		0		0	PCY	10		SW	A	95	75	0	0-1
442	07AUG80		0		0	PCY	10	10-15	E	A	95	76	0	2-3
443	08AUG80		0		0	PCY-R	10	10-20	E	C	94	76	0.50	2-4
444	09AUG80		0		0	PCY	10	10-20	E	A	95	73	0	2-4
445	10AUG80		0		0	PCY	10	8-14	SE	A	93	82	0	2-4
446	11AUG80		0		0	PCY-R	10	8-14	VAR	C	85	73	1.00	2-4
447	12AUG80		0		0	PCY-R	10		SE	C	93	74	1.31	1-3
448	13AUG80		0		0	PCY	10	8-14	S	A	92	77	0.01	1-2
449	14AUG80		0		0	PCY-R	10	8-14	SW	A	91	76	0.78	1-3
450	15AUG80		0		0	PCY-R	10	6-14	S	C	91	75	1.16	1-2
451	16AUG80		0		0	CY-R	0-10	6-12	S	C	91	74	0.90	1-3
452	17AUG80		0		0	CY-R	10	5-12	S	A	91	75	0.03	1-2
453	18AUG80		0		0	PCY	10	5-12	S	A	94	76	0	0-1
454	19AUG80		0		0	PCY	10	5-12	SW	A	93	76	0	
455	20AUG80		0		0	PCY	10	3-6	VAR	A	95	77	0	
456	21AUG80		0		0	PCY	10	5-10	W	A	98	78	0	
457	22AUG80		0		0	PCY	10	6-12	W	A	98	78	0	
458	23AUG80		0		0	PCY	10	6-12	N	A	95	75	0	1-2
459	24AUG80		0		0	PCY-R	10	5-10	E	A	92	76	0.47	0-2
460	25AUG80		0		0	PCY-R	10	5-10	SE	A	92	73	0.77	1-3
461	26AUG80		0		0	PCY	10	6-12	SE	A	91	70	0	0-1
462	27AUG80		0		0	PCY	10	6-12	SE	A	88	71	TR.	0-1
463	28AUG80		0		0	PCY-R	10	6-12	SE	A	87	70	0.05	0-3
464	29AUG80	+1.0	2400	+1.6	1800	CL	12	06-12	SE	A	89	70	TR.	0-3
465	30AUG80	+1.0	0	+1.6	1800	PC	10	06-12	SE	A	89	70	TR.	0-3
466	31AUG80	+0.9	1200	+1.8	1600	PC	10	06-12	SE	A	92	80	0	1-3

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECP	W-HGT
467	01SEP80	+0.7	0	+2.0	0	0	PC	10	04-08	SE	A	93	73	0
468	02SEP80	+1.6	2400	+2.1	800	PC	PC	10	06-12	SE	A	92	73	0.50
469	03SEP80	+1.3	900	+2.2	1400	PC	PC	10	05-15	SE	A	87	73	0.37
470	04SEP80	+1.5	0	+2.1	0	PC	PC	10	10-20	SE	A	85	73	0.50
471	05SEP80	+1.9	300	+2.4	800	PC	PC	10	10-15	SE	A	91	73	0
472	06SEP80	+0.7	180	+2.0	800	PC	PC	10	04-08	SE	A	93	72	0
473	07SEP80	+0.9	1900	+1.5	600	PC	PC	10	03-06	V	A	95	73	0
474	08SEP80	+0.2	2000	+1.8	1000	PC	PC	10	06-08	V	A	97	73	TR.
475	09SEP80	+0.8	2000	+1.5	1200	PC	PC	10	05-10	SE	A	98	75	0
476	10SEP80	+0.8	0	+1.5	0	PC	PC	10	10	N	A	99	74	0
477	11SEP80	+0.8	700	+1.5	1400	PC	PC	10	05-10	NE	A	96	73	0
478	12SEP80	+1.2	0	+1.7	1600	PC	PC	10	07-14	SE	A	92	73	0
479	13SEP80	+0.8	1000	+1.8	2400	PC	PC	10	05-12	ESE	A	94	73	0
480	14SEP80	+1.4	600	+1.8	300	PC	PC	10	03-10	NE	A	96	72	0
481	15SEP80	+0.9	1200	+1.9	300	PC	PC	10	05-10	E	A	96	73	0
482	16SEP80	+1.5	2130	+1.8	2300	PC	PC	10	10-15	V	A	94	75	0
483	17SEP80	+0.8	1900	+2.4	400	CLOUDY	CLOUDY	10	10-15	SE	C	79	74	1.26
484	18SEP80	+0.6	1515	+1.6	2400	CLOUDY	CLOUDY	8	10	S	A	85	69	0.75
485	19SEP80	+0.5	1800	+2.3	700	CLOUDY	CLOUDY	10	LIGHT	V	A	85	72	2.73
486	20SEP80	+0.3	2000	+2.1	1000	PC	PC	10	10	SE	A	90	75	0.34
487	21SEP80	+0.3	2000	+2.1	1000	PC	PC	10	06-15	E	A	91	75	0
488	22SEP80	+0.9	1830	+2.3	800	PC	PC	10	05-10	SE	A	92	75	0
489	23SEP80	+1.1	2200	+2.3	800	PC	PC	10	08-12	V	A	92	73	0
490	24SEP80	+1.5	2400	+2.2	1400	PC	PC	15	06-10	SE	A	93	74	0
491	25SEP80	+1.4	700	+2.2	1500	PC	PC	10	05-10	SW	A	87	74	0.67
492	26SEP80	+0.6	1000	+1.8	2200	PC	PC	10	05-10	SW	A	88	72	0
493	27SEP80	+0.7	1000	+1.9	2200	PC	PC	10	07-12	V	A	89	68	0
494	28SEP80	+0.8	1000	+2.0	2400	PC	PC	10	06-12	N	A	90	67	0.23
495	29SEP80	+0.9	1200	+2.5	400	PC	PC	10	06-12	S	A	92	74	0.02
496	30SEP80	+0.4	1400	+2.4	500	CLOUDY	CLOUDY	8	07-14	NW	A	78	72	0.76

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WND-S	DIR	CL	X-T	M-T	PRECP	W-HGT
497	01OCT80	+0.8	1100	+1.7	400	CLEAR	10	05-12	SW	A	77	65	0	0-3
498	02OCT80	+0.6	1600	+1.9	600	CLEAR	10	08-16	NW	A	84	62	0	
499	03OCT80	+0.2	2100	+1.2	200	CLEAR	10	08-14	NW	A	79	56	0	
500	04OCT80	+0.5	2400	+1.6	1000	CLEAR	10	06-12	SE	A	77	50	0	
501	05OCT80	+0.0	2000	+1.2	400	CLEAR	10	08-16	NW	A	75	56	0	
502	06OCT80	+0.0	2400	+0.9	1400	CLEAR	10	06-12	NE	A	75	48	0	1-3
503	07OCT80	+0.4	2400	+1.0	1500	CLEAR	10	LIGHT	V	A	79	48	0	0
504	08OCT80	+0.9	800	+1.2	2300	CLEAR	10	LIGHT	V	A	84	51	0	0
505	09OCT80	+0.6	600	+1.4	2230	CLEAR	10	00-05	V	A	86	54	0	0
506	10OCT80	+0.2	0	+1.5	0	CLEAR	10	LIGHT	V	A	88	58	0	0
507	11OCT80	+0.9	0	+1.4	0	CLEAR	10	LIGHT	V	A	89	61	0	0
508	12OCT80	+0.0	0	+1.5	0	CLEAR	10	04-08	NW	A	77	51	0	0
509	13OCT80	+0.0	0	+0.6	0	CLEAR	10	04-08	NE	A	76	47	0	0
510	14OCT80	+0.3	0	+1.5	0	CLEAR	10	06-12	SE	A	82	46	0	0
511	15OCT80	-0.2	0	+1.9	0	CLEAR	10	10-16	SE	A	85	57	0	0
512	16OCT80	+0.8	0	+2.5	0	PC	10	10-16	SE	A	82	67	0.21	0
513	17OCT80	+0.8	0	+2.5	0	CLOUDY	10	10-20	S	A	86	70	TR.	0
514	18OCT80	+0.5	0	+2.3	0	CLOUDY	10	05-15	S	A	82	76	TR.	0
515	19OCT80	+0.5	0	+2.5	0	CLOUDY	10	07-15	NW	A	79	68	0.18	0
516	20OCT80	+0.2	0	+1.0	0	CLOUDY	10	02-10	N	A	70	53	0	0
517	21OCT80	+0.8	0	+1.6	0	CLOUDY	10	03-07	NE	A	73	53	0	0
518	22OCT80	+0.6	0	+1.5	0	PC	10	04-08	E	A	81	58	0	0-1
519	23OCT80	+0.8	0	+2.1	0	PC	10	04-08	SE	A	83	62	0.01	0-1
520	24OCT80	+0.7	0	+2.0	0	CLOUDY	10	12-16	S	A	78	64	0.05	0-1
521	25OCT80	+0.0	0	+1.1	0	PC	10	10-20	NW	A	66	44	0.01	0-2
522	26OCT80		0		0	PC	10	12-15	E	A	72	41	0	0
523	27OCT80		0		0	PC	10	10-18	S	A	80	51	0	0-2
524	28OCT80	+0.5	0	+2.8	0	CLOUDY	01-05	08-12	W	A	76	67	1.65	0-1
525	29OCT80	+0.9	0	+2.2	0	CLOUDY	00-05	08-16	N	A	50	54	0.79	0-2
526	30OCT80		0		0	CLOUDY	8	05-16	N	A	51	49	0	0-2
527	31OCT80	+0.0	0	+0.9	0	PC	10	05-10	NE	A	69	41	0	0-1

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECP	W-HGT
528	01NOV80	+0.2	0	+1.2	0	0 PC	10	05-10	N	A	74	40	0	0-1
529	02NOV80	+0.2	0	+1.2	0	0 PC	10	05-10	NE	A	77	46	0	0
530	03NOV80	+0.2	0	+1.2	0	0 PC	10	05-10	N	A	75	48	0	0
531	04NOV80	+0.2	0	+1.4	0	0 PC	10	05-10	N	A	81	53	0	0
532	05NOV80	+0.4	0	+1.2	0	0 CLEAR	10	05-10	N	A	73	43	0	0
533	06NOV80	+0.2	0	+1.2	0	0 CLEAR	10	05-10	V	A	76	44	0	0
534	07NOV80	+0.3	0	+1.6	0	0 CLEAR	10	07-14	SW	A	79	53	0	0-1
535	08NOV80	+1.2	0	+2.2	0	0 CLEAR	10	06-12	SW	A	80	53	0	0-1
536	09NOV80	+0.2	0	+2.0	0	0 CLEAR	10	10-15	SW	A	81	51	0	0-1
537	10NOV80	+0.2	0	+2.2	0	0 CLEAR	10	05-10	NE	A	78	55	0	0
538	11NOV80	+0.3	0	+1.7	0	0 CLOUDY	10	07-14	E	A	72	56	0	0-1
539	12NOV80	+0.5	0	+1.8	0	0 PC	10	15-20	E	A	70	52	0	0
540	13NOV80	+0.4	0	+2.6	0	0 CLOUDY	10	10-20	SE	A	80	58	0	0-3
541	14NOV80	+1.3	0	+2.8	0	0 CLOUDY	10	10-15	SE	A	82	65	0	0-2
542	15NOV80	+1.4	0	+2.6	0	0 PC	10	10-20	SE	A	80	60	0	0-4
543	16NOV80	+1.4	0	+1.8	0	0 PC	10	10-15	SE	A	80	60	0	0-3
544	17NOV80	+1.7	0	+2.7	0	0 CLOUDY	10	10-20	W	A	78	65	0.02	0-3
545	18NOV80	+0.8	0	+2.6	0	0 CLOUDY	10	12-22	NW	A	52	45	0	0-2
546	19NOV80	+0.2	0	+0.7	0	0 CLEAR	10	05-10	NW	A	54	33	0	0-1
547	20NOV80	-0.3	0	+1.2	0	0 CLEAR	10	06-10	NE	A	60	32	0	0-1
548	21NOV80	-0.6	0	+1.4	0	0 PC	10	06-12	N	A	62	31	0	0-1
549	22NOV80	-0.5	0	+1.9	0	0 CLOUDY	10	06-12	NE	A	55	49	0.01	0-2
550	23NOV80	+0.9	0	+2.6	0	0 CLOUDY	10	10-20	SE	A	69	51	0.58	2-4
551	24NOV80	+0.0	0	+2.5	0	0 CLOUDY	10	10-15	NW	A	57	54	0	0-1
552	25NOV80	+0.3	0	+0.7	0	0 CLOUDY	10	06-12	NE	A	55	45	0	0-1
553	26NOV80	+0.5	0	+1.9	0	0 CLOUDY	10	10-20	NE	A	55	46	1.19	0
554	27NOV80	+0.0	0	+2.3	0	0 CLOUDY	10	07-15	W	A	58	40	0.05	0-3
555	28NOV80	+0.2	0	+2.0	0	0 CLOUDY	10	10-20	W	A	54	35	0	0-3
556	29NOV80	0.0	0	+1.0	0	0 PC	10	5	NW	A	60	30	0	0-1
557	30NOV80	+0.4	0	+1.3	0	0 CLEAR	10	5	NW	A	68	37	0	0

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
558	01DEC80	+0.4	0	+1.8	0	CLEAR	10	S	NW	A	73	45	0	0
559	02DEC80	+0.8	0	+1.9	0	CLEAR	10	05-10	NW	A	77	57	0	0-4
560	03DEC80	+0.0	0	+1.7	0	CLEAR	10	08-12	N	A	60	40	0	0-2
561	04DEC80	+0.3	0	+1.3	0	CLEAR	10	10	SE	A	67	37	0	0-2
562	05DEC80	+0.6	0	+1.7	0	CL	10	0-5	NE	A	72	42	0	0
563	06DEC80	0.6	0	1.7	0	PC	10	5-10	SE	A	74	49	0	0
564	07DEC80	0.7	0	2.3	0	PC	10	0-10	SE	A	75	49	0	0-1
565	08DEC80	0.6	0	2.7	0	PC	10	0-10	S	A	77	54	0	0
566	09DEC80	0.5	0	2.7	0	CL	0-7	12-20	SW	A	77	65	0.21	0-1
567	10DEC80		0		0	CL	10	8-14	NW	A	58	48	0.50	0-2
568	11DEC80		0		0	CL	10	5-10	N	A	58	34	0	0-1
569	12DEC80	-0.1	0	1.6	0	CL	10	4-8	W	A	66	33	0	0
570	13DEC80	0.3	0	1.5	0	CL	10	5-10	W	A	67	37	0	0
571	14DEC80	-0.2	0	1.3	0	PC	10	8-12	N	A	64	43	0	0-2
572	15DEC80		0	1.0	0	PC	10	5-10	S	A	67	31	0	0-1
573	16DEC80	0.8	0	1.2	0	PC	10	5-10	W	A	63	51	0.05	0-2
574	17DEC80	0.0	0	1.2	0	CL	10	8-10	N	A	58	36	0	0-2
575	18DEC80	0	0	1.6	0	CL	10	6-12	S	A	65	36	0	0
576	19DEC80	0.1	0	1.6	0	PC	10	6-12	S	A	73	47	0	0
577	20DEC80	-0.5	0		0	PC	10	10-20	N	A	62	37	0	0-2
578	21DEC80	-0.2	0	0.8	0	PC	10	8-10	N	A	49	32	0	0-2
579	22DEC80	-0.5	0	1.8	0	PC	10	3-10	NE	A	58	30	0	0
580	23DEC80	0	0	1.9	0	PC	10	5-15	S	A	67	43	0	0
581	24DEC80	0.5	0	2.0	0	CL	10	4-12	S	A	60	30	0.02	0-1
582	25DEC80	-1.2	0	0.5	0	PC	10	10-20	N	A	43	29	0	0-3
583	26DEC80	-0.2	0	1.4	0	PC	10	5-15	N	A	50	28	0	1-2
584	27DEC80	-0.2	0	0.5	0	CL	8	15-25	N	A	50	33	0	0-1
585	28DEC80	0.3	0	0.7	0	PC	10	6-12	N	A	58	27	0	0-2
586	29DEC80	-0.3	0	0.6	0	CL	10	4-12	NE	A	66	36	0	0-1
587	30DEC80	-0.4	0	0.6	0	PC	10	6-14	NE	A	54	39	0	0-2
588	31DEC80	-0.1	0	1.1	0	PC	10	6-12	N	A	63	28	0	0

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WND-S	DIR	CL	X-T	M-T	PREC	W-HGT
589	1JAN81	-0.1	0	1.2	0	0	PC	10	6-12	NW	A	67	35	0
590	02JAN81	-0.5	0	0.7	0	0	PC	10	8-16	NW	A	59	33	0
591	03JAN81	-0.4	0	0.8	0	0	F	10	10	N	A	64	31	0
592	4JAN81	-0.6	0	1.3	0	0	F	10	10-16	N	A	61	41	0
593	5JAN81	-0.3	0	0.5	0	0	F	10	6-12	NE	A	48	28	0
594	6JAN81	0	0	1.6	0	0	CY	10	6-12	S	A	56	35	0
595	7JAN81	0	0	1.7	0	0	PC	10	0-2	N	A	54	39	0
596	8JAN81	0.2	0	1.6	0	0	F	10	10	V	A	55	28	0
597	9JAN81	0.2	0	1.7	0	0	PC	10	2-5	N	A	55	32	0
598	10JAN81	-0.8	0	0.4	0	0	CL	10	10-20	N	A	51	31	0
599	11JAN81	-0.3	0	0.4	0	0	CL	10	10-16	N	A	49	23	0
600	12JAN81	0	0	-0.5	0	0	CL	10	4-12	N	A	40	20	0
601	13JAN81	0	0	1.0	0	0	CL	10	4-10	W	A	52	17	0
602	14JAN81	0.0	0	1.6	0	0	CY	8	6-12	W	A	60	34	0
603	15JAN81	0.0	0	1.4	0	0	PC	0-4	6-12	NW	A	60	34	0
604	16JAN81	0.0	0	1.0	0	0	CL	10	6-12	N	A	53	34	0
605	17JAN81	-0.5	0	0.6	0	0	CL	10	6-12	N	A	46	26	0
606	18JAN81	-1.1	0	0.8	0	0	CL	10	10-20	N	A	55	22	0
607	19JAN81	-0.9	0	1.2	0	0	PC	10	2-5	NE	A	58	30	0
608	20JAN81	-0.9	0	1.2	0	0	CL	5	10-30	SW	A	54	31	0
609	21JAN81	-0.2	0	1.2	0	0	CY	10	6-13	NW	A	43	41	0
610	22JAN81	0.0	0	1.4	0	0	CY	10	6-12	NW	A	51	41	0
611	23JAN81	0.0	0	1.4	0	0	PC	10	4-10	NW	A	57	36	0
612	24JAN81	0.5	0	1.4	0	0	PC	10	4-12	W	A	63	31	0
613	25JAN81	0.4	0	1.4	0	0	PC	10	5-10	S	A	68	35	0
614	26JAN81	0.4	0	1.4	0	0	CY	10	10-15	S	A	71	44	0
615	27JAN81	0.4	0	1.4	0	0	CL	10	10-15	W	A	73	52	0
616	28JAN81	0.6	0	1.6	0	0	C	10	5-10	N	A	66	45	0
617	29JAN81	0.6	0	1.9	0	0	CY	10	5-10	S	A	69	38	0
618	30JAN81	0.6	0	1.9	0	0	PC	10	2-6	V	A	72	50	0
619	31JAN81	0	0	0	0	0	PC	10	12-18	E	A	51	46	0

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
620	01FEB81		0		0	CL	10	0-3	S	A	73	50	0.38	0-3
621	02FEB81		0		0	C	10	15-25	W	A	48	32	0	0-2
622	03FEB81		0		0	C	10	6-12	NW	A	48	20	0	0-1
623	04FEB81		0		0	PC	10	6-12	N	A	52	35	0	0-1
624	05FEB81		0		0	CL	8	6-12	N	A	47	32	0.10	0-2
625	06FEB81	0.5		1.8	0	CL	8	5-10	S	A	48	40	1.61	0-2
626	07FEB81	0.8		1.4	0	CL	8		S	A	56	46	0.01	0-1
627	08FEB81	0.6		2.0	0	CL	8	10-20	N	A	0	0	0	0-2
628	09FEB81	0.5		1.5	0	PC	8	6-15	S	A	60	35	0	0-2
629	10FEB81	0.5		2.8	0	CY	4	12-32	S	A	63	53	5.16	2-4
630	11FEB81	-0.4		1.9	0	PC	8	10-30	N	C	60	32	0	2-4
631	12FEB81	-1.0		0.5	0	PC	10	6-12	N	A	43	18	0	0-2
632	13FEB81		0		0	CY	8	10-12	NE	A	43	29	0	0-2
633	14FEB81	-0.3		-0.7	0	CL	8	5-12	NE	A	57	42	0	0-2
634	15FEB81	-0.3		1.9	0	CL	7	6-12	E	A	61	50	0.09	0-1
635	16FEB81	0.8		2.0	0	CL	7	10-15	NE	A	67	56	0.61	0-1
636	17FEB81	0.8		2.0	0	CY	0.4	8-14	SE	A	73	58	0.10	0-1
637	18FEB81	0.7		2.0	0	CL	0-4		V	A	74	36	1	0
638	19FEB81	0.5		1.8	0	PC	0-6	2-5	SW	A	77	51	0	0-1
639	20FEB81	0.4		1.6	0	PC	0-6	10-15	NW	A	79	56	0	0-1
640	21FEB81	0.5		1.4	0	CY	0-2	6-12	S	C	78	53	0	0-2
641	22FEB81	-0.9		0.5	0	CL	10	10-15	S	A	64	57	0.10	0-1
642	23FEB81	0.5		1.0	0	PC	10	10-20	W	A	70	43	0	0-2
643	24FEB81	0.5		0.9	0	PC	2-10	6-12	NW	A	75	41	0	0-1
644	25FEB81	0.5		1.6	0	PCF	0-8	6-12	SW	A	75	47	0	0-1
645	26FEB81	0.2		1.0	0	PC	0-8	0-2	V	A	80	51	0	0-1
646	27FEB81	0.3		1.6	0	CYF	1-8	5-10	S	A	82	48	0	0-1
647	28FEB81	0.3		1.7	0	CY	0-6	6-12	SW	A	76	49	0	0-1

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
648	01MAR81	0.9	0	1.9	0	CL	8	12-18	SW	A	75	58	0	0-1
649	02MAR81	0.2	0	2.0	0	CL	8	6-12	NW	A	73	52	T	0-1
650	03MAR81	0.0	0	2.1	0	CY	10	6-12	SE	A	69	45	0	0-1
651	04MAR81	0.4	0	1.7	0	CY	8	15-25	S	A	72	58	T	0-2
652	05MAR81	0.8	0	2.0	0	CL	8	15-25	NW	A	77	55	0.3	0-2
653	06MAR81	-0.2	0	1.4	0	C	8	6-12	N	A	67	42	0	0-2
654	07MAR81	0.3	0	1.4	0	CL	8	5-10	E	A	62	51	0	0-2
655	08MAR81	0.2	0	1.0	0	CY	10	5-12	N	A	68	48	0	0-2
656	09MAR81	0.2	0	0.7	0	PC	10	6-12	NE	A	70	42	0	0-1
657	10MAR81	0.3	0	1.2	0	PC	8	8-10	NW	A	67	40	0	0-1
658	11MAR81	0.0	0	1.2	0	PC	10	6-12	N	A	72	40	0	0-1
659	12MAR81	0.0	0	1.6	0	F	10	6-12	V	A	69	46	0	0-1
660	13MAR81	0.0	0	1.2	0	PC	8	4-6	V	A	70	45	0	0-1
661	14MAR81	0.0	0	1.2	0	CL	10	6-12	N	A	77	50	0	0-1
662	15MAR81	0.0	0	0.9	0	PC	2-8	6-12	N	A	63	51	0	0-1
663	16MAR81	0.0	0	1.6	0	CL	10	15-25	NW	A	72	52	0	0-2
664	17MAR81	0.3	0	1.8	0	PC	10	10-18	S	A	70	40	0	0-2
665	18MAR81	1.2	0	2.5	0	PC	10	15-35	SW	C	80	58	0	0-3
666	19MAR81	-0.3	0	0.5	0	CL	10	15-30	SE	C	64	40	0	2-4
667	20MAR81	0.0	0	0.7	0	PC	10	6-12	E	A	68	48	0	0-1
668	21MAR81	0.4	0	1.5	0	PC	10	6-12	SE	A	70	48	0	0-1
669	22MAR81	0.2	0	2.2	0	PC	8	10-20	SE	C	70	50	0	0-2
670	23MAR81	0.0	0	0.5	0	PC	10	10-20	SE	A	64	48	0	0-1
671	24MAR81	-0.6	0	0.5	0	CL	10	6-14	N	A	69	40	0	0-1
672	25MAR81	-0.3	0	0.6	0	CL	8	0-8	E	A	71	41	0	0-1
673	26MAR81	0.0	0	1.4	0	PC	6-10	2-15	SE	A	72	40	0	0-2
674	27MAR81	0.0	0	1.5	0	CL	6-10	6-15	SE	A	75	42	0	0-1
675	28MAR81	-0.1	0	1.6	0	PC	10	8-20	SE	A	77	54	0	0-2
676	29MAR81	0.5	0	3.0	0	C	5-8	5-20	SE	A	72	63	1.5	1-4
677	30MAR81	1.7	0	2.5	0	PC	10	6-14	SE	A	84	35	0	0-1
678	31MAR81	1.5	0	2.0	0	C-FOG	0-2	5-12	SE	A	78	58	0	0-1

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
679	01APR81	0.5	0	1.5	0	0 PC	8	8-14	NW	A	70	58	0	0-2
680	02APR81	0.2	0	1.7	0	0 CL	10	6-18	V	A	83	50	0	0-2
681	03APR81	0.5	0	1.5	0	0 PC	8	5-25	SE	A	73	65	0	0-3
682	04APR81	1.0	0	2.1	0	0 CL	10	8-18	NW	A	78	63	0	0-2
683	05APR81	0.0	0	2.0	0	0 CL	10	6-15	NW	A	75	63	0	0-2
684	06APR81	0.0	0	1.4	0	0 CL	10	6-18	E	A	75	45	0	0-1
685	07APR81	0.3	0	1.8	0	0 PC	10	10-20	SE	A	75	47	0	0-2
686	08APR81	0.5	0	2.3	0	0 PC	10	10-20	SE	A	76	53	0	0-2
687	09APR81	0.6	0	2.0	0	0 PC	10	10-20	S	A	82	63	0	0-2
688	10APR81	0.3	0	2.3	0	0 PC-FOG	0-8	6-20	SE	A	76	61	0	0-2
689	11APR81	0.5	0	2.1	0	0 PC-FOG	1-8	6-18	SE	A	79	63	0	0-1
690	12APR81	0.4	0	2.0	0	0 PC-FOG	1-8	6-18	SE	A	79	62	0	0-2
691	13APR81	0.7	0	1.5	0	0 CL	10	0-15	SE	A	80	64	0	0-1
692	14APR81	0.6	0	1.4	0	0 CL	8	6-18	N	A	80	63	0	0-2
693	15APR81	0.5	0	1.3	0	0 CL	8	8-18	SE	A	85	62	0	0-1
694	16APR81	0.7	0	1.4	0	0 PC	8	10-18	SE	A	85	62	0	0-1
695	17APR81	0.8	0	1.6	0	0 CL	10	7-15	SE	A	83	62	0	0-2
696	18APR81	1.0	0	1.6	0	0 CL	4-10	2-15	SE	A	84	64	0	0-2
697	19APR81	0.9	0	1.6	0	0 PC	10			A	85	61	0	0-1
698	20APR81	1.0	0	1.7	0	0 PC	8	6-18	NW	A	87	65	0	0-1
699	21APR81	0.8	0	1.9	0	0 PC	6-8	2-14	S	A	83	65	0	0-1
700	22APR81	0.8	0	2.0	0	0 PC	8	4-16	SE	A	81	61	0.01	1-2
701	23APR81	0.8	0	2.5	0	0 PC	8	4-16	SE	A	86	68	0	1-2
702	24APR81	0.5	0	1.8	0	0 PC	8	0-4	N	A	86	68	0	0-1
703	25APR81	0.5	0	2.2	0	0 PC	8	0-4	NE	A	81	62	0	0-1
704	26APR81	0.1	0	2.0	0	0 CL	10	4-12	NE	A	83	62	0	0-1
705	27APR81	0.2	0	1.9	0	0 CL	10	4-14	SE	A	84	55	0	0-1
706	28APR81	0.6	0	2.0	0	0 PC	8	5-15	SE	A	85	62	0	0-2
707	29APR81	0.7	0	1.6	0	0 C	8	10-18	S	A	83	62	1.00	0-2
708	30APR81	0.8	0	1.6	0	0 PC	6	2-10	V	A	89	64	0	0-2

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
709	01MAY81	0.6	0	1.1	0	CL	10	5-15	N	A	89	64	0	0-2
710	02MAY81	0.7	0	1.9	0	CL	10	6-16	N	A	87	61	0	0-2
711	03MAY81	1.2	0	2.4	0	C	6	10-22	SE	A	81	51	0	0-2
712	04MAY81	1.1	0	2.7	0	C	6	12-25	SE	A	81	61	0	1-3
713	05MAY81	0.4	0	1.3	0	PC	10	0-5	SE	A	82	68	7.50	1-3
714	06MAY81	0.7	0	2.0	0	PC	6	5-15	V	A	67	62	0.58	1-3
715	07MAY81	0.4	0	2.5	0	C	8	6-20	V	A	75	62	0	0-2
716	08MAY81	0.0	0	2.3	0	PC	8	2-15	N	A	79	58	0	2-3
717	09MAY81	0.4	0	2.3	0	PC	8	6-10	SE	A	80	60	0	1-2
718	10MAY81	0.4	0	2.3	0	PC	4	5-15	SE	A	82	60	0	1-2
719	11MAY81	0.0	0	1.2	0	CL	10	4-14	NE	A	83	62	0	0-2
720	12MAY81	0.1	0	1.9	0	CL	10	8	N	A	80	58	0	0
721	13MAY81	0.5	0	1.0	0	CL	10	14	SE	A	83	35	0	0-1
722	14MAY81	0.9	0	1.4	0	C	8	6-15	SE	A	82	61	0	0-1
723	15MAY81	0.5	0	1.0	0	CL	10	8-15	NE	A	83	62	0	0-2
724	16MAY81	0.7	0	1.8	0	CL	10	5-20	SE	A	74	60	0	1-2
725	17MAY81	0.9	0	1.9	0	PC	10	5-20	SE	A	77	60	0	1-2
726	18MAY81	0.5	0	1.9	0	PC	8	8-15	S	A	80	61	0	0-2
727	19MAY81	0.9	0	2.2	0	C	4-8	12-22	S	C	78	67	2.00	1-3
728	20MAY81	0.4	0	1.8	0	C	8	10-20	NW	A	80	66	0	1-2
729	21MAY81	0.0	0	1.5	0	PC	8	12-20	NW	A	79	63	0	1-2
730	22MAY81	0.0	0	1.8	0	CL	10	0-5	N	A	85	65	0	0-1
731	23MAY81	0.3	0	1.9	0	PC	8	2-10	SE	A	82	63	0	1-2
732	24MAY81	0.5	0	2.1	0	C	8	12-20	SE	A	82	61	0	1-3
733	25MAY81	0.6	0	2.2	0	PC	8	8-12	S	A	84	71	0	1-2
734	26MAY81	1.1	0	2.2	0	C	8	5-12	SW	A	86	70	1.50	1-3
735	27MAY81	1.1	0	2.0	0	PC	10	10-20	E	A	86	67	0	1-2
736	28MAY81	0.7	0	1.5	0	CL	10	2-10	SW	A	88	66	0	0
737	29MAY81	1.0	0	1.5	0	C	10	4-12	SW	A	88	68	0.5	0-2
738	30MAY81	0.5	0	1.6	0	C	10	2-10	SE	A	89	69	0	0-1
739	31MAY81	0.4	0	1.8	0	C	10	6-12	S	A	83	67	0	0

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
740	01JUN81				0	0 CL	5	8-18	S	A	82	68	0	1-3
741	02JUN81	0.7		2.2	0	0 PC	8	12-18	SE	A	89	74	0	1-2
742	03JUN81	0.2		2.3	0	0 CL	6	12-18	S	A	91	74	0	1-2
743	04JUN81	0.1		2.6	0	0 PC	8	14-20	S	A	90	73	0	1-3
744	05JUN81	0.2		2.6	0	0 PC	8	12-18	S	A	89	72	0	1-3
745	06JUN81	1.0		2.5	0	0 PC	8	15-20	SW	A	92	78	0	1-2
746	07JUN81	0.6		2.5	0	0 CL	6	5-12	V	A	90	72	0	0-1
747	08JUN81	0.8		1.8	0	0 CL	6	0-20	SE	A	92	78	0	0-2
748	09JUN81	0.6		1.8	0	0 PC	8	4-18	SE	A	92	73	0	0-3
749	10JUN81	0.8		1.5	0	0 CL	8	6-16	SE	A	94	78	1.0	1-3
750	11JUN81	0.8		1.8	0	0 PC	8	6-16	SE	A	92	74	0	1-3
751	12JUN81	0.9		1.9	0	0 PC	8	8-18	SE	A	90	80	0	1-3
752	13JUN81	0.7		2.1	0	0 PC	10	8-20	SE	A	92	78	0	2-4
753	14JUN81	0.8		2.3	0	0 PC	10	8-20	SE	A	92	74	0	1-3
754	15JUN81	0.5		2.2	0	0 C	10	4-16	SE	A	93	74	0	1-2
755	16JUN81	0.3		2.2	0	0 PC	10	6-10	N	A	93	71	0	0-1
756	17JUN81	0.1		1.8	0	0 PC	10	4-10	N	A	95	76	0	0-1
757	18JUN81	0.0		2.0	0	0 PC	8	4-10	NE	A	96	76	0	0-1
758	19JUN81	0.0		1.8	0	0 PC	8	0-10	NE	A	96	76	0	0-1
759	20JUN81	0.2		2.0	0	0 C	10	4-15	SW	A	95	77	0	0-1
760	21JUN81	0.3		1.8	0	0 PC	8	2-12	SW	A	96	75	0	0-1
761	22JUN81	0.4		1.7	0	0 PC	10	0-10	W	A	95	75	0	0-1
762	23JUN81	0.4		1.8	0	0 CL	8	4-12	V	A	93	74	0	0-1
763	24JUN81	0.6		1.7	0	0 CL	8	4-15	S	A	94	73	0	0-1
764	25JUN81	0.3		1.4	0	0 CL	8	4-12	V	A	95	75	T	0-1
765	26JUN81	0.8		1.3	0	0 CL	8	4-16	V	A	92	75	0.04	0-2
766	27JUN81	0.4		1.3	0	0 PC	8	2-12	NE	A	92	69	0.04	0-2
767	28JUN81	0.4		1.8	0	0 CL	5	2-15	V	A	93	71	0	0-2
768	29JUN81	0.7		2.4	0	0 CL	6	10-18	SE	A	93	70	3.0	0-2
769	30JUN81	1.0		2.4	0	0 C	8	2-18	SE	A	94	72	0	0-2

(continued)

Table B1 (continued)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	T'ME	SKY-COND	VISIB	WND-S	DIR	CL	X-T	M-T	PRECIP	W-HGT
770	01JUL81	0.4	0	2.8	0	CL	6	6-15	SE	A	85	71	0.21	0-2
771	02JUL81	0.7	0	2.7	0			6-18	SE	A	84	70	0	0-2
772	03JUL81	0.6	0	2.9	0	CL	8	10-20	SE	A	84	72	T	1-2
773	04JUL81		0		0			6-14	SE	A	88	69	0	0-2
774	05JUL81	0.7	0	2.3	0	CL	8	15-25	S	A	90	70	1.00	1-3
775	06JUL81	1.0	0	2.1	0	PC	8	12-18	S	A	90	74	0.24	1-2
776	07JUL81	0.8	0	1.7	0	C	10	8-16	SE	A	92	72	0	0-2
777	08JUL81	0.8	0	1.5	0	C	10	0-12	N	A	96	74	0	0-1
778	09JUL81	0.8	0	1.3	0	PC	10	10-45	SE	A	95	71	0	1-4
779	10JUL81	0.8	0	1.5	0	CL	6	8-16	N	A	94	72	T	1-3
780	11JUL81	0.8	0	1.9	0	PC	8	6-12	NF	A	94	72	0	1-3
781	12JUL81	0.5	0	1.9	0	C	10	6-14	S	A	93	72	0	0-2
782	13JUL81	0.3	0	1.7	0	C	10	2-12	SW	A	96	73	0.10	0-1
783	14JUL81	0.3	0	1.5	0	C	10	6-16	S	A	98	74	0	0-3
784	15JUL81	0.3	0	1.8	0	C	10	4-14	S	A	98	75	0	0-2
785	16JUL81	0.3	0	1.5	0	C	10	3-16	S	A	100	77	0	1-3
786	17JUL81	0.0	0	2.0	0					A	99	73	0	
787	18JUL81	0.4	0	1.9	0	PC	10	1-15	S	A	99	74	T	0-2
788	19JUL81	0.0	0	1.9	0	C	10	7-14	S	A	98	76	0	0-1
789	20JUL81	0.4	0	1.7	0	PC	8	10-50	S	A	98	75	0.01	1-4
790	21JUL81	0.5	0	1.5	0	C	10	8-16	V	A	97	75	0	1-2
791	22JUL81	0.4	0	1.3	0	CL	8	6-14	W	A	100	76	0	0-2
792	23JUL81	0.7	0	1.2	0	C	10	6-12	S	A	99	76	0	0-2
793	24JUL81	1.0	0	1.3	0	PC	10	4-16	S	A	99	76	0	0-2
794	25JUL81	0.7	0	1.8	0	PC	10	4-15	S	A	95	78	T	0-1
795	26JUL81	0.7	0	1.9	0	CL	8	5-12	SE	A	98	76	T	0-1
796	27JUL81	0.7	0	2.3	0	CL	6	6-14	SE	A	97	74	T	0-1
797	28JUL81	0.9	0	2.3	0	CL	8	5-10	NE	A	98	74	T	
798	29JUL81	0.3	0	2.3	0	CL	8	5-10	NW	A	100	77	0	
799	30JUL81	0.2	0	2.3	0	CL	8	10	NW	A	90	71	0.10	
800	31JUL81	0.2	0	2.3	0	CL	8	0-15	SE	A	95	75	0	

(continued)

Table B1 (concluded)

Meteorology Data

CIR	DATE	M-MLW	TIME	X-MLW	TIME	SKY-COND	VISIB	WIND-S	DIR	CL	X-T	M-T	PRECP	W-HGT
801	01AUG81	0.2	0	2.3	0	0 CL	8	15	SE	A	98	76	0	
802	02AUG81	0.8	0	1.8	0	0 CL	8	10	SE	A	97	73	0	
803	03AUG81	0.2	0	1.8	0	0 CL	8			A	99	73	0	
804	04AUG81		0		0	0 CL	8	5	SE	A	96	74	0	
805	05AUG81	1.1	0	2.0	0	0 CL	8	5	E	A	98	75	0	
806	06AUG81	1.1	0	2.0	0	0 CL	8	5	SE	A	88	70	0	
807	07AUG81	1.1	0	1.9	0	0 CL	8	5-15	SE	A	88	72	0.03	
808	08AUG81	0.7	0	2.0	0	0 CL	7	5-15	SW	A	89	73	0.01	
809	09AUG81	0.8	0	1.5	0	0 CL	8	5-10	SW	A	88	72	0.01	
810	10AUG81	0.8	0	1.8	0	0 CL	8	5-10	SW	A	89	72	0	
811	11AUG81	1.3	0	2.2	0	0 CL	8	10	SE	A	93	74	0	
812	12AUG81		0	2.2	0	0 CL	8	10	SE	A	98	73	0	
813	13AUG81	0.9	0	2.2	0	0 CL	7	15	E	A	95	72	0	
814	14AUG81	0.4	0	2.3	0	0 CL	8	0-5	SE	A	98	80	0	
815	15AUG81	0.4	0	2.2	0	0 CL	8	10	SE	A	98	72	0	
816	16AUG81	0.4	0	2.2	0	0 CL	8	15	SE	A	98	74	0	
817	17AUG81	0.7	0	2.2	0	0 CL	8	5	SE	A	99	72	0	
818	18AUG81	0.5	0	2.1	0	0 CL	7	20	W	A	92	70	0	
819	19AUG81	0.5	0	2.0	0	0 CL	8	10	SE	A	95	76	0	
820	20AUG81	1.7	0	2.2	0	0 CL	8	10	SE	A	98	78	0	
821	21AUG81	0.7	0	1.9	0	0 CL	8	10	N	A	98	78	0	
822	22AUG81	0.7	0	2.1	0	0 CL	8	10	E	A	99	79	0	
823	23AUG81	0.7	0	2.1	0	0 CL	8	10	E	A	94	72	0	
824	24AUG81	0.7	0	2.3	0	0 CL	8	10	N	A	91	73	0	
825	25AUG81	0.7	0	2.5	0	0 CL	8	15	NE	A	91	72	0	
826	26AUG81	0.7	0	2.5	0	0 CL	8	0-15	E	A	90	71	0	
827	27AUG81	0.8	0	2.5	0	0 CL	8	15	NE	A	84	71	0	
828	28AUG81		0		0	0 CL	8	10	SE	A	85	71	0	

Note: CIR - Contractors Inspection Report

M-MLW - Minimum Low Water

X-MLW - Maximum Low Water

SKY-COND - Sky Conditions

VISIB - Visibility, miles

WIND-S DIR - Wind Velocity (mph) and Direction

CL - Weather Classification Explained on CIR

X-T - Maximum Temperature, F

M-T - Minimum Temperature, F

PRECP - Accumulative Rainfall (24 hrs), in.

W-HGT - Wave Height, ft

Table B2

 OFFICE OPERATIONS - JIM MEAD
 CONTRACT NO. 01-70-C-0135

CIR	DOR	DATE	CPEM	CL	STATION-CUT		DISPOSAL-FILL	CHARACTER-OF-CUT-MATERIAL				***CHANNEL***				***WORK-PERFORMED***				AMOUNT	
					START	STOP	START	STOP	STEP	2	3	4	5	6	7	8	9	10	11		
190	1	20A0V77	42	S	223+00	223+40	223+00	223+40	223+00	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
191	2	20A0V77	42	S	223+40	223+70	223+40	223+70	223+40	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
192	3	20A0V77	42	S	223+70	224+00	223+70	224+00	223+70	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
193	4	20A0V77	42	S	224+00	224+30	224+00	224+30	224+00	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
194	5	20A0V77	42	S	224+30	224+60	224+30	224+60	224+30	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
195	6	20A0V77	42	S	224+60	224+90	224+60	224+90	224+60	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
196	7	20A0V77	42	S	224+90	225+20	224+90	225+20	224+90	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
197	8	20A0V77	42	S	225+20	225+50	225+20	225+50	225+20	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
198	9	20A0V77	42	S	225+50	225+80	225+50	225+80	225+50	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
199	10	20A0V77	42	S	225+80	226+10	225+80	226+10	225+80	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
200	11	20A0V77	42	S	226+10	226+40	226+10	226+40	226+10	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
201	12	20A0V77	42	S	226+40	226+70	226+40	226+70	226+40	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
202	13	20A0V77	42	S	226+70	227+00	226+70	227+00	226+70	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
203	14	20A0V77	42	S	227+00	227+30	227+00	227+30	227+00	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
204	15	20A0V77	42	S	227+30	227+60	227+30	227+60	227+30	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
205	16	20A0V77	42	S	227+60	227+90	227+60	227+90	227+60	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
206	17	20A0V77	42	S	227+90	228+20	227+90	228+20	227+90	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
207	18	20A0V77	42	S	228+20	228+50	228+20	228+50	228+20	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
208	19	20A0V77	42	S	228+50	228+80	228+50	228+80	228+50	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
209	20	20A0V77	42	S	228+80	229+10	228+80	229+10	228+80	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
210	21	20A0V77	42	S	229+10	229+40	229+10	229+40	229+10	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
211	22	20A0V77	42	S	229+40	229+70	229+40	229+70	229+40	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
212	23	20A0V77	42	S	229+70	230+00	229+70	230+00	229+70	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
213	24	20A0V77	42	S	230+00	230+30	230+00	230+30	230+00	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
214	25	20A0V77	42	S	230+30	230+60	230+30	230+60	230+30	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
215	26	20A0V77	42	S	230+60	230+90	230+60	230+90	230+60	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
216	27	20A0V77	42	S	230+90	231+20	230+90	231+20	230+90	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
217	28	20A0V77	42	S	231+20	231+50	231+20	231+50	231+20	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
218	29	20A0V77	42	S	231+50	231+80	231+50	231+80	231+50	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
219	30	20A0V77	42	S	231+80	232+10	231+80	232+10	231+80	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
220	31	20A0V77	42	S	232+10	232+40	232+10	232+40	232+10	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
221	32	20A0V77	42	S	232+40	232+70	232+40	232+70	232+40	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0
222	33	20A0V77	42	S	232+70	233+00	232+70	233+00	232+70	74	13	14	0	1	5.0	25.0	17.5	34.0	40	2530	75.0

(continued)

Table B2 (continued)

 PROJECT OPERATING - JIN-HEAN
 CONTRACT NO. 61-79-C-0135

CIR	JOB	DATE	COST	STATION-CUT		DISPOST-FILL	STATION-FILL	EXCAVATION		WATERIAL	CUT-WATERIAL		BANK		AVERAGE DEPTH		CUT-ADV.		PIPE		SHORE		DREDGED		CU-YDS
				START	STOP		START	STOP	STOP		START	STOP	START	STOP	MLV	MLV	FT	FT	FT	FT	FT	FT	FT	FT	
223	71	01JUN73	55	5	257+70	257+10	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	0	3305	15750	0	0	0
224	25	22JAN73	58	5	257+70	257+00	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	0	3305	15750	0	0	0
225	25	15JAN73	58	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	15	3625	15750	0	0	3014
226	27	14JAN73	58	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	15	3625	15750	0	0	13040
227	23	05JAN73	58	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	110	3545	15750	0	0	23101
228	23	05JAN73	58	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	110	3545	15750	0	0	13367
229	41	07JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	60	3745	15750	0	0	8008
230	41	07JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	45	3745	15750	0	0	2669
231	42	07JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	15	3745	15750	0	0	24025
232	43	10JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	135	4045	15750	0	0	9008
233	44	11JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	45	4045	15750	0	0	16103
234	45	12JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	30	2270	9030	0	0	3561
235	45	13JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	170	2270	9030	0	0	22446
236	47	14JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	260	2270	9030	0	0	31007
237	48	15JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	150	2470	9030	0	0	12081
238	49	16JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	130	2470	9030	0	0	17164
239	50	17JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	150	2470	9030	0	0	21786
240	51	18JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	150	2470	9030	0	0	19806
241	52	19JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	140	2470	9030	0	0	18486
242	53	20JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	115	2470	9030	0	0	12968
243	54	21JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	26030
244	55	22JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	9711
245	56	23JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	13066
246	57	24JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	24081
247	58	25JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	21219
248	59	26JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	35556
249	60	27JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	32551
250	61	28JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	33222
251	62	29JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	32552
252	63	30JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	26807
253	64	31JAN73	61	5	257+70	257+15	234+00	234+00	234+00	0	0	0	0	0	0	6.5	24.0	0	310	200	2780	9030	0	0	0

(continued)

Table B2 (continued)

DPENG OPERATIONS - JIM HEAL
CONTACT NO. 01-79-C-1175

CIR	DOR	DATE	CPE#	CL	*STATION-CUT*		STOP	START	DISPOSAL-FILL		STOP	CLAY SAND SILT	SHELL	CUT-MATERIAL	GRAVEL	***CHANNEL***		AVERAGE DEPTH	WASH	CUT-ADJ.	DREDGED		CU-YDS	AMOUNT
					START	STOP	CLAY SAND SILT	STOP	START	STOP	CLAY SAND SILT	STOP	START	STOP	CLAY SAND SILT	GRAVEL	WASH	WASH	WASH	WASH	WASH	WASH	WASH	WASH
254	65	01FEB80	75		212+75	211+65	117+00	317+00	2	94	4	0	0	0	0	0	25.0	33.0	8.0	470	110	4000	9435	15318
255	65	02FEB80	72	C	211+65	210+55	311+00	311+00	2	94	4	0	0	0	0	0	25.0	33.0	8.0	470	210	4150	7385	29244
256	67	03FEB80	72	C	20+55	211+50	1+00	208+70	2	94	4	0	0	0	0	0	25.0	33.0	8.0	470	195	2900	6885	21125
257	68	04FEB80	72	C	218+40	215+30	4+00	4+00	2	94	4	0	0	0	0	0	36.0	42.0	6.0	380	260	2925	710	21955
258	69	05FEB80	72	C	215+00	213+30	6+00	6+00	2	94	4	0	0	0	0	0	36.0	42.0	6.0	380	250	3200	6835	21111
259	70	06FEB80	72	C	213+30	209+75	7+00	7+00	3	93	4	0	0	0	0	0	36.0	42.0	6.0	380	355	3300	6835	22977
260	71	07FEB80	72	C	209+75	214+50	8+00	8+00	3	93	4	0	0	0	0	0	36.0	42.0	6.0	380	245	3300	6835	13651
261	72	08FEB80	72	C	219+50	220+00	9+00	9+00	3	93	4	0	0	0	0	0	25.0	42.0	10.5	380	95	2315	6800	4222
262	73	09FEB80	72	C	220+00	221+00	9+50	9+50	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	55	2615	6800	18278
263	74	10FEB80	72	C	221+00	221+95	210+00	210+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	95	2615	6800	23926
264	75	11FEB80	72	C	221+95	222+50	10+50	10+50	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	29278
265	75	12FEB80	72	N	222+50	224+05	11+00	11+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	31111
266	77	13FEB80	72	N	224+05	225+45	11+00	11+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	29278
267	78	14FEB80	72	N	225+45	226+85	11+00	11+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	31111
268	79	15FEB80	72	N	226+85	228+15	11+50	11+50	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	27444
269	81	16FEB80	71	N	229+15	229+95	13+00	13+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	35766
270	81	17FEB80	71	N	229+95	231+45	13+00	13+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	31667
271	82	18FEB80	71	N	231+45	233+10	13+00	13+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	33672
272	83	19FEB80	71	N	233+10	234+50	14+00	14+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	28570
273	84	20FEB80	71	N	234+50	235+05	14+00	14+00	75	10	15	0	0	0	0	0	25.0	42.0	17.0	380	155	2070	7385	11224
274	85	21FEB80	71	N	235+05	235+20	18+00	18+00	60	10	15	0	0	0	0	0	25.0	42.0	17.0	380	15	3170	8435	3272
275	85	22FEB80	71	F	222+50	223+75	21+00	21+00	60	10	15	0	0	0	0	0	25.0	42.0	17.0	380	125	2850	7740	25556
276	87	23FEB80	71	C	223+75	224+95	21+00	21+00	60	10	15	0	0	0	0	0	25.0	42.0	17.0	380	125	2850	7740	25556
277	89	24FEB80	64	C	224+95	226+15	22+00	22+00	70	10	15	0	0	0	0	0	25.0	42.0	17.0	380	125	2850	7740	25556
278	92	25FEB80	64	C	226+15	227+20	22+00	22+00	70	10	15	0	0	0	0	0	25.0	42.0	17.0	380	125	2850	7740	25556
279	93	26FEB80	64	C	227+20	228+40	23+00	23+00	80	10	15	0	0	0	0	0	25.0	42.0	17.0	380	125	2850	7740	25556
280	91	27FEB80	64	C	228+40	229+10	23+00	23+00	80	10	15	0	0	0	0	0	25.0	42.0	17.0	380	125	2850	7740	25556
281	92	28FEB80	64	C	229+10	230+00	24+00	24+00	80	10	15	0	0	0	0	0	25.0	42.0	17.0	380	125	2850	7740	25556
282	93	29FEB80	64	C	230+00	231+70	24+00	24+00	80	10	15	0	0	0	0	0	25.0	42.0	17.0	380	125	2850	7740	25556

(continued)

Table B2 (continued)

 OCEAN OPERATIONS - JUNE 1984
 CONTRACT NO. 01-79-C-0185

CIR NO	DATE	CIR CL	*STATION-CUT*		DISPOSAL-FILL	CHARACTER-OF-CUT-MATERIAL			***CHANNEL***		AVERAGE DEPTH		BANK WIDTH		ADJ. CUT-DO		PIPE SHORE		DRENCHED CU-YDS
			START	STOP	START	STOP	CLAY SAND SILL SHELL GP/L	%	MLW	FT	FT	FT	FT	FT	FT	FT	FT	FT	
620	172	01FEB81	52	C	372+45	374+20	154+00	154+20	100	0	0	0	0	0	0	0	0	0	22887
621	173	02FEB81	42	C	374+20	375+25	154+20	154+20	100	0	0	0	0	0	0	0	0	0	15750
622	174	03FEB81	53	C	373+25	375+15	159+00	159+00	100	0	0	0	0	0	0	0	0	0	8500
623	175	04FEB81	68	C	373+15	377+70	159+00	159+25	40	0	0	0	0	0	0	0	0	0	24398
624	176	05FEB81	68	C	377+70	379+70	159+00	159+25	55	0	0	0	0	0	0	0	0	0	15741
625	177	06FEB81	54	C	373+70	379+15	159+50	159+75	70	0	0	0	0	0	0	0	0	0	7333
626	178	07FEB81	64	C	373+15	380+65	159+75	160+50	45	0	0	0	0	0	0	0	0	0	23611
627	179	08FEB81	64	C	380+65	381+80	160+50	161+00	90	0	0	0	0	0	0	0	0	0	18102
628	180	09FEB81	64	C	381+80	381+80	161+00	161+00	90	0	0	0	0	0	0	0	0	0	0
629	181	10FEB81	54	C	381+80	382+45	161+00	161+75	95	0	0	0	0	0	0	0	0	0	9711
630	182	11FEB81	54	C	10+10	9+25	161+25	161+50	10	0	0	0	0	0	0	0	0	0	15970
631	183	12FEB81	64	C	7+25	9+25	161+50	162+00	5	0	0	0	0	0	0	0	0	0	21233
632	184	13FEB81	64	C	3+20	7+05	161+75	161+85	5	0	0	0	0	0	0	0	0	0	21594
633	185	14FEB81	64	C	7+05	5+75	161+85	161+95	5	0	0	0	0	0	0	0	0	0	18055
634	186	15FEB81	64	C	5+75	4+40	161+95	162+25	5	0	0	0	0	0	0	0	0	0	26250
635	187	16FEB81	64	C	381+24	382+64	162+25	162+25	5	0	0	0	0	0	0	0	0	0	25278
636	188	17FEB81	64	C	381+24	381+24	162+25	162+40	5	0	0	0	0	0	0	0	0	0	14583
637	189	18FEB81	64	C	381+24	381+29	162+40	162+55	5	0	0	0	0	0	0	0	0	0	3630
638	190	19FEB81	64	C	6+55	0+70	162+55	162+55	5	0	0	0	0	0	0	0	0	0	20069
639	191	20FEB81	64	C	0+70	0+20	162+55	166+25	5	0	0	0	0	0	0	0	0	0	21671
640	192	21FEB81	64	C	9+10	7+95	166+25	166+40	5	0	0	0	0	0	0	0	0	0	19549
641	193	22FEB81	64	C	7+95	5+90	166+40	166+55	15	0	0	0	0	0	0	0	0	0	35609
642	194	23FEB81	64	C	5+90	4+80	166+55	166+70	15	0	0	0	0	0	0	0	0	0	20472
643	195	24FEB81	64	C	4+80	3+40	166+70	167+30	25	0	0	0	0	0	0	0	0	0	22022
644	196	25FEB81	64	C	4+05	3+00	167+30	177+50	75	0	0	0	0	0	0	0	0	0	12717
645	197	26FEB81	64	C	3+00	2+80	177+50	171+45	75	0	0	0	0	0	0	0	0	0	3722
646	198	27FEB81	64	C	3+00	2+80	171+45	171+45	75	0	0	0	0	0	0	0	0	0	19500
647	199	28FEB81	64	C	5+70	1+90	171+45	171+75	75	0	0	0	0	0	0	0	0	0	0

(continued)

Table B2 (continued)

ORDER OF OPERATIONS - JIM BEAR
CONTRACT NO. 61-79-0-0135

CIR	DOR	DATE	CREW	CL	STATION-CUT		DISPOSAL-FILL	CHARACTERISTICS OF CUT-MATERIAL				CUT-IN		BANK WIDTH ADV.		FLOAT SHORE		AMOUNT DPEDED CU-YDS
					START	STOP	START	STOP	CLAY SAND SILT SHELL	GRVL	AVERAGE DEPTH	MLW	FT	FT	FT	FT	FT	
648	207	31MAR81	54		1+97	1+25	171+75	171+55	75	15	0	0	0	397	65	4170	30395	14083
649	201	02MAR81	64		1+35	1+75	171+85	172+5	15	75	0	0	0	390	85	3670	30395	13195
650	202	03MAR81	64	C	9+75	7+75	172+00	172+15	15	75	0	0	0	350	100	3570	30395	20740
651	203	04MAR81	54	C	7+75	6+95	172+15	173+15	15	75	0	0	0	525	80	3720	30395	23333
652	204	05MAR81	54	C	6+95	6+50	173+00	173+10	15	75	0	0	0	525	45	3705	30395	14000
653	205	06MAR81	54	C	6+50	5+60	173+00	173+50	50	45	0	0	0	500	110	3705	30395	30556
654	205	07MAR81	64	C	5+40	4+15	173+50	174+00	50	45	0	0	0	500	125	3705	30395	32407
655	207	08MAR81	64	C	4+15	3+30	174+50	174+50	55	45	0	0	0	500	85	3705	30395	21250
656	203	09MAR81	64	C	3+30	1+80	158+50	159+50	45	55	0	0	0	500	150	3675	30395	36111
657	209	10MAR81	64	C	1+80	0+80	158+50	176+60	45	55	0	0	0	500	100	3270	30895	27778
658	210	11MAR81	64	C	0+80	7+40	177+00	177+00	45	55	0	0	0	500	120	3270	30895	31111
659	211	12MAR81	64	C	9+00	7+00	177+00	177+50	45	55	0	0	0	500	150	3270	30895	31815
660	212	13MAR81	54	C	7+00	6+60	177+50	178+00	45	55	0	0	0	500	130	3270	30895	29889
661	213	14MAR81	64	C	6+60	5+30	178+00	178+50	45	55	0	0	0	530	130	3070	30895	30622
662	214	15MAR81	64	C	5+30	4+30	178+50	179+30	45	55	0	0	0	530	130	3070	30895	33174
663	215	16MAR81	54	C	4+00	2+05	179+50	179+50	45	55	0	0	0	530	195	3070	30895	40171
664	215	17MAR81	54	C	2+05	1+09	179+50	181+50	45	55	0	0	0	530	96	3070	30895	19789
665	217	18MAR81	64	C	1+09	0+50	184+50	184+50	45	55	0	0	0	530	59	3070	30895	15055
666	219	19MAR81	64	C	0+50	0+55	185+50	185+50	45	55	0	0	0	530	105	3270	30895	26794
667	219	20MAR81	54	C	3+60	1+50	186+50		45	55	0	0	0	530	115	3270	30895	31408
668	220	21MAR81	64		1+50	2+00	187+50	2+55	45	55	0	0	0	530	105	3470	30895	24583
669	221	22MAR81	64		2+55	3+00	190+00		45	55	0	0	0	365	75	3470	30895	12067
670	222	23MAR81	64		3+00	1+80	192+00		45	55	0	0	0	530	90	3470	30895	21200
671	223	24MAR81	64		1+80	2+30	194+00		45	55	0	0	0	440	50	3470	30895	9378
672	224	25MAR81	54		2+30	2+50	194+00		45	55	0	0	0	350	30	3470	30895	4667
673	225	26MAR81	64		2+10	3+00	200+00		45	55	0	0	0	480	90	3470	30895	14400
674	226	27MAR81	64		3+00	4+75	201+50	204+50	45	55	0	0	0	450	175	2470	30895	26250
675	227	28MAR81	54		4+75	6+90	203+50	204+50	45	55	0	0	0	420	215	2570	30895	40133
676	228	29MAR81	54		6+90	9+30	204+50	204+50	45	71	0	0	0	385	240	2870	30895	30800
677	229	30MAR81	64		9+30	12+35	207+00	200+00	35	65	0	0	0	300	305	3050	30595	37278
678	230	31MAR81	54		12+35	14+40	200+00	200+00	55	45	0	0	0	230	205	3425	30595	24448

(continued)

Table B2 (continued)

CONTRACT NO. 01-70-C-038

CIR	DNR	DATE	CREN	CL	STATION - CUT		DISPOSAL - FILL		CHARACTER OF CUT - MATERIAL				CHANNEL				DPRK - PERFORMED				AMOUNT DREDGED CU-YDS
					START	STOP	START	STOP	CLAY	SAND	SILT	SHLL	GR/L	BEFORE	AFTER	CUT - MLW	CUT - FT	ADV. PD	PIPE FT	SHORE PIPE FT	
679	231	01APR81	64		14+60	15+65	190+00	200+00	20	30	0	0	0	0	24.0	0.	230	125	3425	30595	14907
680	232	02APR81	64		15+65	16+65	193+00	198+00	30	20	0	0	0	0	25.0	0.	125	150	1630	30595	14907
681	233	03APR81	64		2+50	3+55	198+00	198+00	80	20	0	0	0	0	36.0	0.	415	135	1425	30595	24900
682	234	04APR81	64		3+55	4+25	198+00	198+00	60	40	0	0	0	0	24.0	0.	415	40	1425	30595	7993
683	235	05APR81	64		4+25	6+00	198+00	198+00	05	35	0	0	0	0	24.0	0.	415	175	1425	30595	34968
684	236	06APR81	64		5+00	7+55	198+00	198+00	55	35	0	0	0	0	24.0	0.	415	155	1675	30595	30971
685	237	07APR81	64		7+55	12+15	199+00	201+50	75	25	0	0	0	0	37.0	0.	340	260	1975	30595	42563
686	238	08APR81	64		10+15	12+80	201+50	203+25	75	25	0	0	0	0	24.0	0.	300	265	2285	30595	35333
687	239	09APR81	64		12+80	15+05	203+25	203+30	75	25	0	0	0	0	37.0	0.	275	225	2520	30595	27500
688	240	10APR81	64		15+05	16+30	203+30	203+80	75	25	0	0	0	0	24.0	0.	255	350	2420	30595	25972
689	241	11APR81	64		7+75	6+10	203+80	203+80	75	5	0	0	0	0	37.0	0.	390	365	2520	30595	31633
690	242	12APR81	64		6+10	2+70	207+00		75	5	0	0	0	0	37.0	0.	390	320	2920	30595	27733
691	243	13APR81	64		1+70	0+70	209+00		95	5	0	0	0	0	38.0	0.	390	200	0	0	22534
692	244	14APR81	64		0+90	0+90	211+00	211+00	0	0	0	0	0	0	0	0.	0	0	0	0	0
693	245	15APR81	64		0+90	0+90	211+00	211+00	0	0	0	0	0	0	0	0.	0	0	0	0	0
694	246	16APR81	64		0+90	0+90	211+00	211+00	0	0	0	0	0	0	0	0.	0	0	0	0	0
695	247	17APR81	64		0+90	0+90	211+00	211+00	0	0	0	0	0	0	0	0.	0	0	0	0	0
696	248	18APR81	64		0+90	0+90	211+00	211+00	0	0	0	0	0	0	0	0.	0	0	0	0	0
697	249	19APR81	64		0+90	0+75	211+00	211+00	95	5	0	0	0	0	23.0	0.	290	15	2926	30595	3467
698	250	20APR81	64		001+10	0+90	211+00	211+00	99	0	0	0	0	0	36.0	0.	390	60	2920	11795	14733
699	251	21APR81	64		1+30	0+90	211+00	211+00	100	0	0	0	0	0	37.0	0.	390	115	3020	30595	30106
700	252	22APR81	64		0+60	1+20	211+00	211+00	100	0	0	0	0	0	39.0	0.	390	60	2020	30595	14733
701	253	23APR81	64		7+50	8+00	212+00		75	75	0	0	0	0	22.0	0.	290	150	3120	30595	21111
702	254	24APR81	64		9+75	9+10	213+00		30	20	0	0	0	0	39.0	0.	120	265	1405	30595	20606
703	255	25APR81	64		9+00	6+85	214+00	214+00	40	20	0	0	0	0	38.0	0.	450	215	1405	30595	17917
704	256	26APR81	64		6+85	3+85	214+00	214+50	50	50	0	0	0	0	43.0	0.	450	300	1405	30595	30000
705	257	27APR81	64		3+85	1+15	214+50	214+50	50	50	0	0	0	0	38.0	0.	515	270	2905	30595	25750
706	258	28APR81	64		1+15	0+30	215+00	215+00	50	50	0	0	0	0	37.0	0.	515	250	3405	30595	28611
707	259	29APR81	64		1+30	3+35	215+50	215+50	75	75	0	0	0	0	43.0	0.	375	360	3205	30595	25000
708	260	30APR81	64		1+80	3+35	218+00	218+00	100	0	0	0	0	0	43.0	0.	575	155	1675	30595	18489

(continued)

Table B2 (continued)

DREDGE OPERATIONS - JIM DEAN
CONTRACT NO. 01-72-C-0335

CIR	DOR	DATE	CRE#	CL	*STATION-CUT*				DISPOSAL-FILL				CHARACTER-OF-CUT-PAVEMENT				***CHANNEL***				*****WORK-PERFORMED*****				AMOUNT DREDGED CU-YDS
					START	STOP	START	STOP	START	STOP	START	STOP	CLAY SAND SILT	SILT	SHELL	GRAVEL	AVERAGE DEPTH BEFORE AFTER	FT	CUT- CUT-	FT	FT	PIPE	SHORE	PIPE	PIPE
709	261	31MAY81	64	E	5+25	4+31	218+00	213+00	70	70	0	0	0	0	0	0	3.0	43.0	0	0	2005	30505	0	0	10222
710	262	02JUN81	64	E	00+50	00+50	218+50	213+50	100	100	0	0	0	0	0	0	3.0	43.0	0	0	2005	30505	0	0	21851
711	263	03MAY81	64	E	7+45	7+45	218+50	213+50	100	100	0	0	0	0	0	0	3.0	43.0	0	0	2005	30505	0	0	21851
712	264	04MAY81	64	E	10+70	14+00	221+50	221+50	100	100	0	0	0	0	0	0	3.0	43.0	0	0	2005	30505	0	0	21851
713	265	05MAY81	64	E	371+21	373+46	221+50	221+50	50	50	25	25	0	0	0	0	40.5	43.0	0	0	1990	30505	0	0	24644
714	266	06MAY81	64	E	373+46	379+01	221+50	221+50	50	50	25	25	0	0	0	0	40.5	43.0	0	0	1990	30505	0	0	24644
715	267	07MAY81	64	E	379+01	382+44	221+50	221+50	50	50	25	25	0	0	0	0	40.5	43.0	0	0	1990	30505	0	0	24644
716	268	08MAY81	64	E	380+92	386+42	221+50	221+50	50	50	25	25	0	0	0	0	40.5	43.0	0	0	1990	30505	0	0	24644
717	269	09MAY81	64	E	386+42	393+35	221+50	221+50	50	50	25	25	0	0	0	0	40.5	43.0	0	0	1990	30505	0	0	24644
718	270	10MAY81	64	S	251+75	251+90	221+50	221+50	15	15	85	85	0	0	0	0	20.0	35.0	0	0	200	307	0	0	3222
719	271	11MAY81	64	S	251+90	252+90	222+25	222+25	15	15	85	85	0	0	0	0	20.0	35.0	0	0	200	307	0	0	3222
720	272	12MAY81	64	S	252+90	255+10	236+00	236+00	85	85	15	15	0	0	0	0	20.0	35.0	0	0	200	307	0	0	3222
721	273	13MAY81	64	S	255+10	257+10	225+00	225+00	100	100	0	0	0	0	0	0	20.0	35.0	0	0	200	307	0	0	3222
722	274	14MAY81	64	S	257+10	258+70	226+75	226+75	100	100	0	0	0	0	0	0	20.0	35.0	0	0	200	307	0	0	3222
723	275	15MAY81	64	S	258+70	260+40	227+50	227+50	35	35	0	0	15	0	0	0	20.0	35.0	0	0	200	307	0	0	3222
724	276	16MAY81	64	S	260+40	262+70	227+50	227+50	90	90	10	10	0	0	0	0	20.0	35.0	0	0	200	307	0	0	3222
725	277	17MAY81	64	S	262+70	265+55	228+00	228+00	99	99	0	0	0	0	0	0	20.0	35.0	0	0	200	307	0	0	3222
726	278	18MAY81	64	S	265+55	267+15	231+00	231+00	80	80	0	0	0	0	0	0	16.0	35.0	0	0	200	307	0	0	3222
727	279	19MAY81	64	S	267+15	268+30	233+00	233+00	80	80	0	0	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
728	280	20MAY81	64	S	268+30	269+45	235+00	235+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
729	281	21MAY81	64	S	269+45	271+29	237+00	237+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
730	282	22MAY81	64	S	271+29	274+29	237+00	237+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
731	283	23MAY81	64	S	274+29	276+49	240+00	240+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
732	284	24MAY81	64	S	276+49	278+69	241+00	241+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
733	285	25MAY81	64	S	278+69	280+89	243+00	243+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
734	286	26MAY81	64	S	280+89	282+09	245+00	245+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
735	287	27MAY81	64	S	282+09	284+29	247+00	247+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
736	288	28MAY81	64	S	284+29	286+49	249+00	249+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
737	289	29MAY81	64	S	286+49	288+69	251+00	251+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
738	290	30MAY81	64	S	288+69	290+89	253+00	253+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222
739	291	31MAY81	64	S	290+89	292+09	255+00	255+00	70	70	20	20	0	0	0	0	14.0	35.0	0	0	200	307	0	0	3222

(continued)

Table B2 (continued)

REEF OPERATIONS - JIN 4848
CONTACT NO. 01-70-C-1135

CIR	DOR	DATE	CREW	CL	STATION-CUT		DISPOSAL-FILL		CHARACTER-IF-CUT-MATERIAL				CHANNEL				ADJRY-PERFORMED				AMOUNT DREDGED CU-YDS
					START	STOP	START	STOP	CLAS.	SAND	SILT	SHELL	%	%	%	MLW	MLW	FT	PD	PIPE	
740	292	01JUN81	64	S	273+10	274+50	254+30	254+30	0	0	0	0	0	0	22.0	35.0	290	140	2305	17380	19548
741	293	02JUN81	64		274+50	274+65	254+30	254+30	0	10	0	0	0	0	23.0	34.0	0	240	215	2305	17380
742	294	03JUN81	64		276+55	279+30	254+30	254+30	50	50	0	0	0	0	21.0	35.0	0	210	245	2805	17380
743	295	04JUN81	64		279+30	280+90	257+00	257+00	50	20	0	0	0	0	23.0	35.0	0	270	160	3105	17380
744	296	05JUN81	64		282+30	282+30	257+00	257+00	100	0	0	0	0	0	22.5	35.0	0	375	110	2205	16380
745	297	06JUN81	64		282+30	283+20	257+00	257+00	100	0	0	0	0	0	23.0	35.0	0	375	120	3405	16380
746	298	07JUN81	54		283+20	284+65	257+00	257+00	100	0	0	0	0	0	22.5	35.0	0	375	145	3405	16380
747	299	08JUN81	64		284+65	285+85	257+30	257+30	50	50	0	0	0	0	21.0	35.0	0	375	120	3605	16380
748	300	09JUN81	64		285+85	287+90	257+30	257+30	70	30	0	0	0	0	26.0	35.0	0	375	205	3705	15380
749	301	10JUN81	64		286+50	287+15	261+50	261+50	40	60	0	0	0	0	35.0	42.0	0	305	225	3805	15380
750	302	11JUN81	54		287+15	271+70	263+00	263+00	15	85	0	0	0	0	30.0	43.0	0	365	265	2005	15380
751	303	12JUN81	64		271+70	274+55	264+50	264+50	20	80	0	0	0	0	28.2	35.0	0	280	285	2005	15380
752	304	13JUN81	64		274+55	277+55	266+50	266+50	0	0	0	0	0	0	21.0	35.0	0	230	300	2005	15380
753	305	14JUN81	54		270+65	271+10	267+30	267+30	30	70	0	0	0	0	35.0	43.0	0	420	230	1805	14380
754	306	15JUN81	54		271+10	272+70	268+00	268+00	10	90	0	0	0	0	35.0	43.0	0	420	160	1805	14380
755	307	16JUN81	64		272+70	274+80	280+00	280+00	30	70	0	0	0	0	35.0	43.0	0	420	210	2105	13380
756	308	17JUN81	64		274+80	277+50	291+00	291+00	10	90	0	0	0	0	35.0	42.0	0	370	280	2305	13380
757	309	18JUN81	64		277+60	279+10	290+00	290+00	23	77	0	0	0	0	35.0	42.0	0	345	150	2355	13380
758	310	19JUN81	54		279+10	281+20	289+50	289+50	0	0	0	0	0	0	34.5	42.0	0	320	210	2355	13380
759	311	20JUN81	64		281+20	283+95	289+50	289+50	10	90	0	0	0	0	35.0	42.0	0	320	275	2655	13380
760	312	21JUN81	54		287+05	283+95	289+50	289+50	10	90	0	0	0	0	35.0	42.0	0	320	310	2655	13380
761	313	22JUN81	64		287+05	283+95	289+50	289+50	10	90	0	0	0	0	35.0	42.0	0	320	310	2655	13380
762	314	23JUN81	64		287+05	287+00	285+00	285+00	10	90	0	0	0	0	35.0	42.0	0	265	225	1755	11380
763	315	24JUN81	54		252+15	255+30	283+50	283+50	90	10	0	0	0	0	26.0	35.0	0	250	315	2055	11380
764	316	25JUN81	65		255+70	259+75	283+50	283+50	100	0	0	0	0	0	26.0	35.0	0	250	316	2355	11380
765	317	26JUN81	65		258+75	262+08	283+50	283+50	100	0	0	0	0	0	26.0	35.0	0	250	283	2655	11380
766	318	27JUN81	55		262+08	265+95	283+00	283+00	65	35	0	0	0	0	27.0	35.0	0	250	327	0	0
767	319	28JUN81	65		265+95	273+50	282+00	282+00	65	35	0	0	0	0	27.0	35.0	0	250	355	1195	11380
768	320	29JUN81	55		267+50	271+00	280+75	280+75	65	35	0	0	0	0	25.0	35.0	0	390	295	2155	11380
769	321	30JUN81	65		251+55	254+30	280+75	280+75	65	35	0	0	0	0	35.0	42.0	0	425	195	2555	11380

(continued)

Table B2 (continued)

ORANGE OPERATING CO. - JET HEAT
CONTRACT NO. 11-79-C-0135

CIR NO	DATE	CROW	CL	*STATION-CUT*		DISPOSAL-FILL		CHARACTERISTICS-OF-CUT-MATERIAL		CHANCELLER		PARK WIDTH ADV.		DORK-PERFORMED		AMOUNT
				START	STOP	START	STOP	CLAY SAND SILT SH&L GRVL	%	AVERAGE DEPTH BEFORE AFTER	MLW	FT	CUT- PD	PIPE	SHORE	
770	322	01JUL81	65	253+00	256+35	272+00	270+00	55	35	0	0	0	400	305	0	31630
771	323	02JUL81	65	256+05	259+30	278+50	276+50	65	35	0	0	0	400	345	3325	38333
772	324	03JUL81	65	260+30	262+05	278+00	278+00	65	35	0	0	0	400	235	3525	26111
773	325	04JUL81	65	262+05	265+05	278+00	278+00	65	35	0	0	0	400	240	3825	24889
774	326	05JUL81	65	265+05	268+20	284+50	284+50	65	35	0	0	0	400	315	3825	32667
775	327	06JUL81	65	268+20	272+60	284+50	286+50	65	35	0	0	0	400	240	3925	21333
776	328	07JUL81	65	250+60	252+30	286+25	286+25	130	0	0	0	0	300	170	2725	20778
777	329	08JUL81	65	252+30	253+35	285+40	285+40	75	0	0	0	0	300	175	2625	20833
778	330	09JUL81	65	253+05	254+20	285+10	285+10	75	0	0	0	0	300	115	2625	20833
779	331	10JUL81	65	254+20	255+70	285+00	285+00	75	0	0	0	0	300	150	2625	33333
780	332	11JUL81	65	240+00	241+10	284+75	284+75	0	0	0	0	0	100	240	2925	21854
781	333	12JUL81	65	242+15	245+35	284+50	284+50	75	0	0	0	0	200	320	2725	23650
782	334	13JUL81	65	240+60	243+50	286+50	286+50	90	10	0	0	0	140	290	2725	22555
783	335	14JUL81	65	243+50	246+15	286+25	286+25	90	10	0	0	0	248	255	2725	29288
784	336	15JUL81	65	246+15	248+25	285+80	285+80	90	10	0	0	0	300	210	2725	30333
785	337	16JUL81	65	248+25	250+40	285+35	285+35	90	10	0	0	0	300	215	2725	31772
786	338	17JUL81	65	250+40	252+10	284+90	284+90	90	10	0	0	0	310	170	3025	30254
787	339	18JUL81	65	252+10	253+50	284+90	284+90	45	0	0	0	0	320	140	3025	24059
788	340	19JUL81	65	253+50	255+20	284+90	284+90	95	0	0	0	0	300	170	3025	24556
789	341	20JUL81	65	255+20	256+90	284+50	284+50	90	10	0	0	0	300	170	3125	28333
790	342	21JUL81	65	240+00	240+45	283+70	283+70	90	10	0	0	0	400	145	2525	11213
791	343	22JUL81	65	240+45	249+15	283+70	283+70	90	10	0	0	0	400	170	2525	32222
792	344	23JUL81	65	255+00	255+45	283+35	283+35	90	10	0	0	0	50	45	3125	0
793	345	24JUL81	65	127+05	129+90	283+15	283+15	90	10	0	0	0	470	195	3125	33944
794	346	25JUL81	65	129+90	131+55	283+00	283+00	95	5	0	0	0	470	155	3125	31594
795	347	26JUL81	65	131+55	133+05	280+50	280+50	95	5	0	0	0	470	150	3325	30028
796	348	27JUL81	65	133+05	134+95	274+00	274+00	95	5	0	0	0	470	190	3625	25589
797	349	28JUL81	65	134+95	135+55	273+75	273+75	95	5	0	0	0	470	110	2825	21062
798	350	29JUL81	65	135+55	136+75	254+00	254+00	95	5	0	0	0	470	120	2825	22977
799	351	30JUL81	65	136+75	137+90	249+00	249+00	95	5	0	0	0	470	115	3625	29018
800	352	31JUL81	65	137+90	138+95	243+00	243+00	95	5	0	0	0	470	175	3025	18278

(continued)

Table B2 (concluded)

DATE: 10/10/81
 CONTRACT NO. 1-79-C-1175

CIR	DOR	DATE	CREW	CL	STATION-CUT		DISPOSED	FILL	CHARACTERISTICS		CLAY	SAND	GRAVEL	S&N	HATCH		ACT. P	CUT- FT	WALK WIDTH		ADV.	DOR-PERFORMED		AMOUNT DREDGED CU-YDS
					START	STOP	START	STOP	CLAY	SAND	GRAVEL				FT	IN			FT	IN	DD	PIPE	PIPE	
801	352	01AUG81	65	C	120+20	141+20	241+00	241+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
802	353	02AUG81	65	C	141+20	141+20	241+00	241+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
803	355	03AUG81	65	C	141+20	141+20	241+00	241+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
804	355	04AUG81	65	C	141+20	141+20	241+00	241+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
805	357	05AUG81	65	C	141+20	141+20	241+00	241+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
806	359	06AUG81	65	C	142+00	143+25	242+50	242+50	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
807	359	07AUG81	65	C	143+25	144+00	243+50	243+50	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
808	350	08AUG81	65	C	144+00	145+25	244+00	244+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
809	351	09AUG81	65	C	145+25	146+00	245+00	245+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
810	362	10AUG81	65	C	146+25	147+00	246+00	246+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
811	363	11AUG81	65	C	148+25	149+00	248+00	248+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
812	364	12AUG81	65	C	148+25	149+00	248+00	248+00	25	5	0	0	0	0	22.0	0.0	37.0	0.0	47.0	12.0	33.0	84.00	0	20880
813	365	13AUG81	65	C	150+00	152+30	244+50	244+50	20	60	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
814	365	14AUG81	65	C	127+45	129+00	241+00	241+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
815	367	15AUG81	65	C	129+00	132+25	240+00	240+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
816	365	16AUG81	65	C	132+25	135+25	239+00	239+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
817	369	17AUG81	65	C	135+25	137+00	237+00	237+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
818	371	18AUG81	65	C	137+00	140+00	237+00	237+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
819	371	19AUG81	65	C	140+00	142+45	236+50	236+50	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
820	372	20AUG81	65	C	142+45	144+00	235+00	235+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
821	373	21AUG81	65	C	144+00	145+35	233+50	233+50	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
822	374	22AUG81	65	C	145+35	147+35	232+50	232+50	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
823	375	23AUG81	65	C	147+35	149+30	232+50	232+50	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
824	375	24AUG81	65	C	148+30	150+25	231+00	231+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
825	377	25AUG81	65	C	152+25	153+75	230+00	230+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
826	378	26AUG81	65	C	153+75	154+00	230+00	230+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
827	379	27AUG81	65	C	154+00	155+00	229+00	229+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880
828	378	28AUG81	65	C	144+00	145+35	231+00	231+00	20	0	20	0	0	0	20.0	0.0	35.0	0.0	47.0	12.0	33.0	84.00	0	20880

Note: CIR - Contractors Inspection Report
 DOR - Dredge Operation Report
 CREW - Total Crew
 CL - Center Line: S & N indicate work south or north of center line

Table B3

EXPLOSIVE OPERATIONS - DEEP BLASTINGS
CONTRACT NO. 11-77-C-1135

CIR	DNR	DATE	CUT#	CL	*STATION-CUT*		DISPOSAL-FILL		CHARACTER-OF-CUT-MATERIAL			***CHARACTERISTICS***				***WORK-PERFORMED***				AMOUNT DREDGED CU-YDS			
					START	STOP	START	STOP	CLAY %	SAND %	SILT %	SHLL %	GP/L %	AVERAGE DEPTH BEFORE AFTER	WIDTH FT	CUT- FT	ADV. FT	FLOAT FT	PIPE FT		SHORE PIPE		
230	1	10JAN80	42	N	222+50	221+66	291+00	291+00	80	10	0	0	0	0	0	8.5	25.0	16.5	303	94	1730	9450	10596
231	2	09JAN80	42	J	221+66	220+11	291+00	291+00	30	10	0	0	0	0	0	8.5	25.0	16.5	303	155	1930	9450	27838
232	3	10JAN80	42	N	220+11	218+32	290+50	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	1930	9450	33312
233	4	11JAN80	42	N	218+32	216+40	291+00	291+50	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	31186
234	5	12JAN80	45	N	216+40	214+24	291+75	291+75	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	43818
235	6	13JAN80	45	N	214+24	213+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	0
236	7	14JAN80	45	S	213+50	212+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	12477
237	8	15JAN80	45	S	212+50	211+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	9021
238	9	16JAN80	45	S	211+50	210+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	26905
239	10	17JAN80	45	S	210+50	209+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	17756
240	11	18JAN80	45	S	209+50	208+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	0
241	12	19JAN80	45	S	208+50	207+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	0
242	13	20JAN80	52	S	207+50	206+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	896
243	14	21JAN80	52	S	206+50	205+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	25086
244	15	22JAN80	52	S	205+50	204+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	20228
245	16	23JAN80	52	S	204+50	203+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	23620
246	17	24JAN80	52	S	203+50	202+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	15117
247	18	25JAN80	48	S	202+50	201+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	9198
248	19	26JAN80	43	S	201+50	200+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	19634
249	20	27JAN80	48	S	200+50	199+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	19150
250	21	28JAN80	48	S	199+50	198+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	11393
251	22	29JAN80	48	S	198+50	197+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	11035
252	23	30JAN80	48	S	197+50	196+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	23446
253	24	31JAN80	43	S	196+50	195+50	291+00	291+00	52	48	0	0	0	0	0	9.0	25.0	16.5	303	179	2130	9450	16728

(continued)

Table B3 (continued)

OPENED OPERATIONS - DAVE BLACKBURN
CONTRACT NO. 11-79-00-1155

CIR	DOR	DATE	CREW	CL	*STATION-CUT*		DISPOSAL-FILL		CHARACTER-OF-CUT-MATERIAL		CLAY SAND SILT	SHELL	GRAVEL	AVERAGE DEPTH		PANK	DORK-DEFORMED		PIPE	SHORE	AMOUNT DREDGED CU-YDS
					START	STOP	START	STOP	CLAY SAND SILT	CHARACTER-OF-CUT-MATERIAL				BEFORE	AFTER		CUT- FT	CUT- FT			
254	25	01FEB80	55	S	274+42	275+13	210+50	210+50	59	41	0	0	0	1.0	20.0	19.0	310	71	3770	17950	17338
255	25	02FEB80	55	S	275+13	275+97	219+00	219+00	59	41	0	0	0	1.0	20.0	19.0	310	84	3770	17850	20025
256	27	03FEB80	55	S	275+97	276+73	218+50	218+50	59	41	0	0	0	1.0	20.0	19.0	310	76	3920	17850	17593
257	25	04FEB80	55	S	276+73	277+27	218+00	218+00	59	41	0	0	0	1.0	20.0	19.0	280	54	3520	18900	12579
258	29	05FEB80	55	S	277+27	277+92	217+50	217+50	59	41	0	0	0	1.0	20.0	19.0	280	75	3720	18900	18833
259	30	06FEB80	47	S	278+92	279+74	217+00	217+00	59	41	0	0	0	0.5	20.0	19.5	278	72	3720	18900	16913
260	31	07FEB80	47	S	279+74	279+33	216+50	216+50	59	41	0	0	0	0.5	20.0	19.5	278	59	3720	18900	13859
261	32	08FEB80	47	S	279+33	280+19	216+00	216+00	59	41	0	0	0	0.5	20.0	19.5	278	86	3720	18900	18559
262	33	09FEB80	47	S	280+19	281+20	215+50	215+50	55	65	0	0	0	0.5	20.0	19.5	273	131	4020	18900	14007
263	34	10FEB80	47	S	281+20	282+33	215+00	215+00	55	65	0	0	0	0.5	20.0	19.5	273	113	4020	18900	12284
264	35	11FEB80	47	S	282+33	283+60	214+50	214+50	55	65	0	0	0	0.5	20.0	19.5	273	127	4020	18900	18223
265	35	12FEB80	47	S	283+60	284+07	214+50	214+50	55	65	0	0	0	0.5	20.0	19.5	273	57	4420	18900	8129
266	37	13FEB80	47	N	284+07	285+14	213+00	213+00	70	3	27	0	0	1.0	20.0	19.0	288	114	3720	18900	14182
267	38	14FEB80	49	N	285+14	286+23	211+50	211+50	70	3	27	0	0	0.7	20.0	19.5	400	109	3720	18900	19332
268	39	15FEB80	48	N	286+23	287+68	210+00	210+00	70	3	27	0	0	0.7	20.0	19.3	400	45	3720	18900	17687
269	40	16FEB80	48	N	287+68	288+55	208+50	208+50	59	41	0	0	0	0.7	20.0	19.3	235	87	3920	18900	44567
270	41	17FEB80	48	N	288+55	289+68	207+00	207+00	59	41	0	0	0	0.7	20.0	19.3	235	113	3920	18900	18827
271	42	18FEB80	48	N	289+68	290+98	205+50	205+50	59	41	0	0	0	0.7	20.0	19.3	213	130	3920	18900	19236
272	43	19FEB80	48	N	290+98	291+30	205+50	205+50	59	41	0	0	0	0.7	20.0	19.3	213	132	3570	19950	17638
273	44	20FEB80	48	N	291+30	292+27	205+00	205+00	55	65	0	0	0	10.0	20.0	13.0	213	157	3570	19950	22676
274	45	21FEB80	48	N	292+27	293+08	204+50	204+50	55	65	0	0	0	6.0	20.0	14.6	213	211	3770	19950	20144
275	45	22FEB80	48	N	293+08	294+25	204+00	204+00	0	0	0	0	0	2.0	28.0	18.0	213	200	3770	19950	20178
276	47	23FEB80	48	S	294+25	295+41	203+50	203+50	0	0	0	0	0	5.0	27.0	22.0	213	86	3870	19950	15425
277	48	24FEB80	48	S	295+41	296+27	203+00	203+00	22	0	1	0	0	5.0	27.0	22.0	213	20	3870	19950	8328
278	49	25FEB80	48	S	296+27	297+47	201+30	201+30	22	0	1	0	0	1.0	25.0	24.0	213	22	1700	15750	4204
279	50	26FEB80	48	S	297+47	298+69	200+40	200+40	22	0	1	0	0	1.0	25.0	24.0	213	144	1800	15750	29039
280	51	27FEB80	48	S	298+69	299+13	200+00	200+00	22	0	1	0	0	1.0	25.0	24.0	213	93	1900	15750	15737
281	52	28FEB80	48	S	299+13	300+06	200+00	200+00	22	0	1	0	0	5.0	25.0	24.0	213	143	2000	15750	22212
282	53	29FEB80	48	S	300+06	301+00	200+00	200+00	22	0	1	0	0	5.0	25.0	24.0	213	143	2000	15750	22212

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$$D(\mathcal{C}) = \{ \mathcal{C} \mid \mathcal{C} \in \mathcal{C} \} = \{ \mathcal{C} \mid \mathcal{C} \in \mathcal{C} \}$$

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521. - 1921 - 22. 10. 1921. (2)

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Table B3 (continued)

DRILLAGE OPERATIONS - DALLAS DISTRICT
CONTRACT NO. 01-70-C-0126

CIR NO	DATE	CREW	CL	*STATION-CUT*		DISPOSAL-FILL		CHARACTER-OF-CUT-MATERIAL	***CHANNEL***				***PERFORMED***				AMOUNT DREDGED CU-YDS	
				START	STOP	START	STOP		CLAY SAND SILT CHUFF	AVERAGE DEPTH BEFORE AFTER	CUT- FT	WATER FT	CUT- FT	ADV. FT	PIPE FT	SHORE FT		
344	115	01MAY80	48	L 320+23	322+55	250+00	250+50	20	0	0	0	24.0	23.0	177	152	3765	17850	9990
345	114	02MAY80	48	S 322+55	325+42	240+50	249+50	20	0	0	0	23.0	23.0	177	152	4115	17850	19824
346	117	03MAY80	45	S 325+42	327+90	240+00	249+00	20	0	0	0	23.0	23.0	177	152	4265	18900	17130
347	118	04MAY80	43	H 327+90	330+40	241+50	248+50	20	0	0	0	22.0	22.0	177	152	5065	18900	23497
348	119	05MAY80	43	H 330+40	331+61	243+00	243+00	20	0	0	0	21.0	21.0	177	152	3115	21000	14144
349	120	06MAY80	48	N 331+61	332+43	242+00	242+50	22	14	14	0	20.0	20.0	302	92	3315	21000	24675
350	121	07MAY80	48	N 332+43	333+98	243+00	242+00	22	14	14	0	20.0	20.0	302	55	3815	21000	15369
351	122	08MAY80	48	N 333+98	334+71	241+50	241+50	22	14	14	0	20.0	20.0	302	73	3815	21000	27639
352	123	09MAY80	48	S 334+71	335+05	240+50	240+50	22	14	14	0	20.0	20.0	302	72	3715	21000	25872
353	124	10MAY80	49	S 335+05	335+55	240+00	240+00	22	14	14	0	20.0	20.0	302	59	3815	21000	21337
354	125	11MAY80	49	S 336+55	336+46	238+00	238+00	22	14	14	0	20.0	20.0	302	50	4215	21000	18495
355	126	12MAY80	49	S 337+46	338+09	237+50	237+50	22	14	14	0	20.0	20.0	302	91	4315	21000	24828
356	127	13MAY80	49	S 338+09	339+29	237+00	237+00	22	14	14	0	20.0	20.0	302	163	4615	21000	22031
357	128	14MAY80	49	S 339+29	340+10	236+50	236+50	22	14	14	0	20.0	20.0	302	120	4715	21000	20378
358	129	15MAY80	49	S 340+10	341+10	236+00	236+00	22	14	14	0	20.0	20.0	302	81	4915	21000	20700
359	130	16MAY80	49	S 341+10	341+73	235+50	235+50	22	14	14	0	20.0	20.0	302	100	4915	21000	24609
360	131	17MAY80	51	S 342+73	342+12	235+00	235+00	62	27	11	0	20.0	20.0	302	63	5315	21000	18012
361	132	18MAY80	51	S 343+12	342+12	234+00	234+00	62	27	11	0	20.0	20.0	302	39	5315	21000	11241
362	133	19MAY80	51	S 344+52	343+52	234+00	234+00	62	27	11	0	20.0	20.0	302	62	5915	23100	18197
363	134	20MAY80	51	S 345+52	344+52	233+00	233+00	62	27	11	0	20.0	20.0	302	78	4215	23100	23507
364	135	21MAY80	51	S 346+67	345+62	233+00	233+00	62	27	11	0	20.0	20.0	302	115	4215	23100	32980
365	136	22MAY80	51	S 347+18	346+18	232+00	232+00	62	27	11	0	20.0	20.0	302	75	4315	23100	19404
366	137	23MAY80	51	S 348+42	346+18	231+00	231+00	62	27	11	0	20.0	20.0	302	76	4415	23100	20007
367	138	24MAY80	51	S 349+18	347+13	230+00	230+00	62	27	11	0	20.0	20.0	302	85	4515	23100	17710
368	139	25MAY80	51	S 350+40	348+13	229+00	229+00	62	27	11	0	20.0	20.0	302	110	4615	23100	19880
369	140	26MAY80	51	S 351+70	349+40	228+00	228+00	62	27	11	0	20.0	20.0	302	127	5115	23100	21548
370	141	27MAY80	51	S 352+25	350+70	227+00	227+00	62	27	11	0	20.0	20.0	287	130	3065	23100	19354
371	142	28MAY80	51	S 353+25	351+25	226+00	226+00	62	27	11	0	20.0	20.0	287	130	3065	23100	22260
372	143	29MAY80	51	S 354+60	352+25	225+00	225+00	62	27	11	0	20.0	20.0	287	125	3215	23100	24739
373	144	30MAY80	51	S 355+75	353+60	224+00	224+00	62	27	11	0	20.0	20.0	287	35	1265	23100	13649
374	145	31MAY80	51	S 356+60	354+60	223+00	223+00	62	27	14	0	20.0	20.0	287	220	950	23100	27258

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BRIDGE OPERATIONS - DAVE BLACKBURN
CONTACT NO. 91-79-C-9135

CIP	DUR	DATE	CREA	CL	*STATION-CUT*	DISPOSAL-FILL	CHARACTER-OF-CUT-MATERIAL	% CLAY SAND	SILT %	% SHELL	% MZL	AVERAGE DEPTH AFTER CUTTING	GARK WIDTH ADV.	CUT - FT	PIPE SHORE	FLOAT ADV.	PERFORMED	*****	
					START STOP	START STOP	CLAY SAND SILT SHELL MZL AVERAGE DEPTH AFTER CUTTING GARK WIDTH ADV. CUT - FT PIPE SHORE FLOAT ADV. PERFORMED	%	%	%	%	FT	FT	FT	FT	FT	CU-YDS	AMOUNT DREDGED	
375	145	01JUN80	51	S	33+06	335+95	365+25	72	14	0	0	1.0	36.0	15.0	287	235	1665	23100	28234
376	147	02JUN80	51	S	33+05	338+55	365+50	72	14	0	0	1.0	36.0	12.0	287	240	1965	23100	25835
377	148	03JUN80	51	S	33+55	340+10	365+75	72	14	0	0	0.5	36.0	12.0	287	155	1965	23100	17981
378	149	04JUN80	51	S	34+10	341+01	366+00	85	10	5	0	0.5	36.0	11.5	287	0	3315	23100	8999
379	150	05JUN80	51	S	34+10	342+55	366+25	85	10	5	0	0.1	36.1	11.5	287	155	3465	23100	15546
380	151	06JUN80	51	S	34+55	344+20	368+25	85	10	5	0	0	36.0	14.0	287	165	3665	23100	17702
381	152	07JUN80	51	S	34+20	345+85	368+25	85	10	5	0	0	36.0	11.5	287	165	3865	23100	18058
382	153	08JUN80	51	S	34+55	347+00	368+00	85	10	5	0	0	36.0	11.5	287	115	4015	23100	10949
383	154	09JUN80	51	S	34+00	348+25	368+00	85	10	5	0	0	35.0	11.5	287	125	4015	23100	12580
384	155	10JUN80	51	S	34+25	349+50	367+50	85	10	5	0	0	35.0	11.5	255	25	3300	23100	2454
385	156	11JUN80	51	S	34+50	349+00	368+00	85	10	5	0	0	35.0	11.5	255	40	3300	23100	3927
386	157	12JUN80	51	S	34+00	350+30	368+50	85	10	5	0	0	35.0	11.0	255	110	3300	23100	11420
387	158	13JUN80	51	S	35+00	351+50	369+00	85	10	5	0	0	35.0	10.0	275	150	3400	23100	15278
388	159	14JUN80	51	S	35+50	353+60	371+00	85	10	5	0	0	34.0	10.0	275	210	3400	24150	21389
389	160	15JUN80	51	S	35+30	354+15	371+50	85	10	5	0	0	34.0	10.0	275	55	4365	24150	8403
390	161	16JUN80	51	S	35+15	355+65	372+00	50	30	20	0	0	25.0	10.0	280	150	4365	24150	21982
391	162	17JUN80	51	S	35+55	357+60	373+00	50	30	20	0	0	25.0	15.0	280	175	4365	24150	25577
392	163	18JUN80	51	S	35+40	358+50	373+00	50	30	20	0	0	25.0	15.0	280	110	1615	26250	15931
393	164	19JUN80	51	S	35+50	359+70	374+00	64+30	45	5	0	0	25.0	15.0	280	120	2515	26250	17192
394	165	20JUN80	51	S	35+90	361+05	375+00	85	10	5	0	0	25.0	15.0	280	135	2465	26250	19230
395	166	21JUN80	51	S	36+15	362+25	375+50	85	10	5	0	0	24.0	14.0	250	120	2865	26250	16442
396	167	22JUN80	51	S	36+25	363+85	376+00	85	10	5	0	0	24.0	13.5	250	150	2965	26250	21364
397	168	23JUN80	51	S	36+35	365+55	376+50	85	10	5	0	0	24.0	15.0	250	150	3265	26250	21730
398	169	24JUN80	51	S	36+45	366+50	377+00	85	10	5	0	0	24.0	15.0	250	145	3365	26250	21663
399	170	25JUN80	51	S	36+50	367+25	377+00	85	10	5	0	0	24.0	15.0	250	45	3465	26250	6635
400	171	26JUN80	51	S	36+90	368+60	377+00	85	10	5	0	0	24.0	14.0	250	135	3565	26250	18535
401	172	27JUN80	51	S	36+25	368+00	377+00	85	10	5	0	0	24.0	15.0	250	10	3565	26250	11550
402	173	28JUN80	51	S	36+40	369+50	377+00	30	60	10	0	0	24.0	14.0	250	155	4015	26250	19861
403	174	29JUN80	51	S	36+35	371+75	377+00	77+00	30	60	0	0	24.0	12.5	260	140	4165	26250	17503
404	175	30JUN80	51	S	37+15	372+60	377+50	20	60	5	15	0	24.0	11.5	260	65	4265	26250	8005

(continued)

Table B3 (continued)

 DREDGE OPERATIONS - DAVE BLACKBURN
 CONTRACT NO. 01-79-C-135

CIR	DOR	DATE	CPEW	CL	*STATION-CUT*		DISPOSAL-FILL		CHARACTER-OF-CUT-MATERIAL		CLAY %	SAND %	SILT %	SHELL %	GRVL	***CHANNEL***		AVERAGE DEPTH	RANK	WIDTH	CUT- FT	CUT- PB	***DRY-DEFORMED***		FLOAT SCORE	AMOUNT DREDGED CU-YDS
					START	STOP	START	STOP	%	%						%	%						MLW	MLW		
405	175	01JUL80	51	S	372+40	372+95	78+00	78+10	5	10	5	0	0	0	0	11.0	24.0	0	260	95	1315	26250	10113			
406	177	02JUL80	51	S	353+55	356+55	73+50	79+50	95	10	5	0	0	0	0	25.0	35.0	10.0	220	370	2655	26250	26879			
407	178	03JUL80	51	S	356+55	359+20	79+00	79+00	45	10	5	0	0	0	0	25.0	35.0	10.0	240	265	2915	26250	24986			
408	179	04JUL80	51	S	359+20	362+00	80+50	80+50	85	10	5	0	0	0	0	25.0	35.0	10.0	240	280	2700	26250	24889			
409	180	05JUL80	51	S	362+00	364+00	80+50	80+50	55	10	5	0	0	0	0	25.0	35.0	10.0	240	270	3465	26250	17453			
410	181	06JUL80	51	S	364+00	365+70	81+00	81+00	60	5	10	0	0	0	0	25.0	35.0	10.0	240	225	3465	26250	13450			
411	182	07JUL80	51	S	365+70	367+95	81+50	81+50	75	10	5	0	0	0	0	25.0	35.0	10.0	240	225	3565	26250	19133			
412	183	08JUL80	51	S	367+95	369+75	82+50	82+50	75	10	5	0	0	0	0	25.0	35.0	10.0	240	180	3765	26250	16235			
413	184	09JUL80	51	S	369+75	370+50	83+00	83+00	45	10	5	0	0	0	0	17.0	27.0	12.0	240	135	3415	26250	10860			
414	185	10JUL80	51	N	369+30	371+00	83+50	83+50	85	10	5	0	0	0	0	14.0	25.0	11.0	205	170	1515	26250	11081			
415	186	11JUL80	51	N	351+00	352+75	83+50	83+50	85	10	5	0	0	0	0	13.0	25.0	12.0	140	175	1915	26250	12445			
416	187	12JUL80	51	N	352+75	354+15	84+00	84+00	35	10	5	0	0	0	0	12.0	24.0	15.0	160	140	2015	26250	12444			
417	188	13JUL80	51	N	354+15	355+50	84+00	84+00	85	10	5	0	0	0	0	12.0	24.0	14.0	160	145	2115	26250	5015			
418	189	14JUL80	51	N	355+50	356+40	84+00	84+00	85	10	5	0	0	0	0	9.0	25.0	16.0	160	80	2115	26250	3793			
419	190	15JUL80	51	N	356+40	357+50	84+50	84+50	85	10	5	0	0	0	0	10.0	27.0	17.0	160	110	2215	26250	5540			
420	191	16JUL80	51	N	357+50	359+10	84+50	84+50	85	10	5	0	0	0	0	10.0	25.0	17.0	160	75	2315	26250	7253			
421	192	17JUL80	51	N	357+10	359+85	85+00	85+00	95	10	5	0	0	0	0	10.0	26.0	17.0	160	75	2950	26250	3667			
422	193	18JUL80	51	N					0	0	0	0	0	0	0			16.0	160	0	2950	26250	0			
423	194	19JUL80	51	N					0	0	0	0	0	0	0			16.0	160	0	2950	26250	0			
424	195	20JUL80	51	N					0	0	0	0	0	0	0			16.0	160	0	2950	26250	0			
425	196	21JUL80	51	N	357+85	360+40	85+00	85+00	85	10	5	0	0	0	0	10.0	26.0	9.5	160	55	2950	26250	2770			
426	197	22JUL80	51	N	360+40	362+05	85+00	85+00	85	10	5	0	0	0	0	10.0	26.0	16.0	160	155	2915	26250	7822			
427	198	23JUL80	51	N	362+05	363+90	85+50	85+50	35	10	5	0	0	0	0	10.0	26.0	14.0	160	155	2915	26250	8770			
428	199	24JUL80	51	N	363+90	365+20	86+00	86+00	45	10	5	0	0	0	0	10.0	25.0	15.0	160	180	3315	27300	5778			
429	200	25JUL80	51	N	365+20	366+55	86+25	86+25	85	10	5	0	0	0	0	10.0	24.0	14.0	160	145	3415	27300	6015			
430	201	26JUL80	51	N	366+55	367+75	86+25	86+25	85	10	5	0	0	0	0	10.0	24.0	14.0	160	110	3515	27300	4563			
431	202	27JUL80	51	N	367+75	370+50	86+75	86+75	85	10	5	0	0	0	0	10.0	24.0	14.0	160	275	3515	27300	22815			
432	203	28JUL80	51	N	370+50	373+10	87+00	87+00	45	10	5	0	0	0	0	11.0	25.0	14.0	160	250	3815	27300	21570			
433	204	29JUL80	51	N	373+10	374+80	87+00	87+00	35	50	5	0	0	0	0	12.0	24.0	12.0	235	170	3915	28350	17755			
434	205	30JUL80	51	N	374+80	376+10	87+50	87+50	85	10	5	0	0	0	0	12.0	24.0	12.0	235	130	4015	28350	13578			
435	206	31JUL80	51	N	376+10	377+50	88+00	88+00	35	5	10	0	0	0	0	12.0	24.0	12.0	260	150	4215	28350	17333			

(continued)

Table B3 (continued)

 AVERAGE OBSERVATIONS - DATE OF OBSERVATION
 CONTRACT NO. 11-7-1-175

CIR	NO	DATE	CREW	CL	STATION-CUT*		DISJUNCTION	STOP	CHARACTER OF CUT-MATERIAL		CLAY SAND SILT	GR/L	AVERAGE DEPTH	MARK WIDTH		CUT- FT	PO	JACK-DEFORMED		AMOUNT DREDGED CU-YDS
					START	STOP			CLAY SAND SILT	GR/L				FT	IN			FT	FT	
436	207	21AUG80	51	N	352+00	353+75	89+00		35	50	5	10	3	24.0	24.0	260	40	4315	28350	6933
437	208	22AUG80	51	N	352+60	353+75	89+50		35	50	5	10	3	24.0	24.0	150	115	2165	28350	7028
438	209	23AUG80	51	N	353+75	354+15	90+00		35	50	5	10	3	24.0	24.0	120	140	2165	28350	6222
439	210	24AUG80	51	N	355+15	357+20	90+50		85	10	5	0	3	24.0	24.0	130	205	2315	28350	9883
440	211	25AUG80	51	N	357+20	359+80	91+00		50	10	5	0	3	25.5	24.0	130	275	2315	28350	13144
441	212	26AUG80	51	N	359+80	362+55	91+50		85	10	5	0	3	24.0	24.0	130	275	2315	28350	13000
442	213	27AUG80	51	N	362+55	365+15	92+00		85	10	5	0	3	25.0	24.0	130	260	3115	28350	13770
443	214	28AUG80	51	N	365+15	369+55	92+50		85	10	5	0	3	24.0	24.0	130	275	3265	28350	13096
444	215	29AUG80	51	N	368+55	373+45	92+50		85	10	5	0	3	24.0	24.0	130	275	3265	28350	8233
445	216	30AUG80	51	N	370+45	370+45	93+00		0	0	0	0	3	24.0	24.0	0	0	0	0	0
446	217	31AUG80	51	N	370+45	374+25	93+00		35	10	5	0	3	24.0	24.0	180	180	3765	28350	10800
447	218	12AUG80	51	N	372+25	374+25	93+00		35	10	5	0	3	24.0	24.0	180	255	4045	28350	15300
448	219	13AUG80	51	N	352+00	352+50	93+00		35	10	5	0	3	24.0	24.0	240	50	1300	28350	11844
449	220	14AUG80	51	N	352+50	352+95	93+00		45	10	5	0	3	24.0	24.0	300	45	2315	28350	2500
450	221	15AUG80	51	N	352+95	354+20	93+50		45	10	5	0	3	24.0	24.0	300	125	2415	28350	9722
451	222	16AUG80	51	N	354+20	356+05	93+75		85	10	5	0	3	24.0	24.0	300	185	2615	28350	12333
452	223	17AUG80	51	N	356+05	358+55	94+00		85	10	5	0	3	24.0	24.0	300	250	2865	28350	16667
453	224	18AUG80	51	N	358+55	361+25	94+25		85	10	5	0	3	24.0	24.0	300	270	3165	28350	20950
454	225	19AUG80	51	N	361+25	363+55	94+50		35	50	5	10	3	24.0	24.0	300	240	3315	28350	16280
455	226	20AUG80	51	N	363+55	366+25	95+00		35	50	5	10	3	24.0	24.0	300	260	3615	28350	14464
456	227	21AUG80	51	N	366+25	368+70	95+50		35	50	5	10	3	24.0	24.0	300	245	3815	28350	13611
457	228	22AUG80	51	N	368+70	370+00	96+00		35	50	5	10	3	24.0	24.0	300	235	3215	28350	13000
458	229	23AUG80	51	N	368+70	370+00	96+00		35	50	5	10	3	24.0	24.0	300	235	3215	28350	22111
459	230	24AUG80	51	N	368+70	370+00	96+00		35	50	5	10	3	24.0	24.0	300	245	3615	28350	18962
460	231	25AUG80	51	N	370+00	372+55	97+00		35	50	5	10	3	24.0	24.0	300	245	3615	28350	14166
461	232	26AUG80	51	N	372+55	374+25	97+25		35	50	5	10	3	24.0	24.0	300	245	3615	28350	15810
462	233	27AUG80	51	N	374+25	376+00	97+50		35	50	5	10	3	24.0	24.0	300	245	3615	28350	19536
463	234	28AUG80	51	N	376+00	378+55	98+00		35	50	5	10	3	24.0	24.0	300	245	3615	28350	9586
464	235	29AUG80	51	N	378+55	381+25	98+25		35	50	5	10	3	24.0	24.0	300	245	3615	28350	13688
465	236	30AUG80	51	N	381+25	384+00	98+50		35	50	5	10	3	24.0	24.0	300	245	3615	28350	19688
466	237	31AUG80	51	N	384+00	387+40	99+75		35	50	5	10	3	24.0	24.0	300	245	3615	28350	21817

(continued)

Table B3 (continued)

DEGREE OPERATIONS - OF C. PLACEMENT
CONTRACT NO. 11-700-0186

CIR	JOB	CASE	CPEA	CL	STATION-CUT		DISPOSAL-FILL		CHARACTER-OF-CUT-MATERIAL		CLAY	SAND	SILT	SHLL	CUT- M/L	AVERAGE DEPTH		BANK	WIDTH	DOV.	WORK-PERFORMED		AMOUNT DREDGED CU-YDS
					START	STOP	START	STOP	START	STOP	4	2	5	1	1	FT	IN	FT	FT	FT	FT	FT	FT
467	239	01SEP80	51	N	377+40	379+40	90+00	90+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24444
468	239	02SEP80	51	N	377+40	341+40	90+00	90+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17335
469	240	03SEP80	51	N	341+40	343+45	90+25	90+25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16638
470	241	04SEP80	51	N	343+25	344+00	90+25	90+25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2588
471	242	05SEP80	51	N	344+00	345+40	90+50	90+50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9639
472	243	06SEP80	51	N	345+40	347+20	90+75	90+75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11267
473	244	07SEP80	51	N	347+20	349+15	100+00	100+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9056
474	245	08SEP80	0		335+00		100+25	100+25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4920
475	245	09SEP80	0		331+00		100+50	100+50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12834
476	247	10SEP80	0		331+00		100+75	100+75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18191
477	243	11SEP80	51	N	327+50	352+40	101+00	101+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22629
478	249	12SEP80	51	N	329+15	332+40	101+25	101+25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29741
479	250	13SEP80	51	N	332+40	336+35	101+50	101+50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10267
480	251	14SEP80	51	N	336+05	337+31	103+25	103+25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19444
481	252	15SEP80	51	N	337+31	339+81	103+25	103+25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1885
482	253	16SEP80	51	N	339+81	340+06	103+50	103+50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22913
483	254	17SEP80	51	N	340+06	343+10	103+75	103+75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9421
484	255	18SEP80	51	N	343+10	344+35	104+00	104+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15102
485	255	19SEP80	51	N	344+35	345+50	104+25	104+25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18611
486	257	20SEP80	51	S	329+20	331+85	104+50	104+50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16111
487	255	21SEP80	51	S	331+85	334+75	104+75	104+75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15000
488	259	22SEP80	51	S	334+75	336+70	105+00	105+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29556
489	260	23SEP80	51	S	336+70	339+50	105+25	105+25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23000
490	261	24SEP80	51	S	339+50	341+80	105+50	105+50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23000
491	262	25SEP80	51	S	341+80	344+10	105+75	105+75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11000
492	263	26SEP80	51	S	344+10	345+20	106+00	106+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22500
493	264	27SEP80	51	S	345+20	347+45	106+00	106+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21500
494	265	28SEP80	51	S	347+45	349+50	106+50	106+50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11000
495	264	29SEP80	51	C	349+50	350+75	106+50	106+50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10490
496	267	30SEP80	51	N	352+70	353+70	106+75	106+75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10490

(continued)

Table B3 (continued)

 FEDERAL HIGHWAY ADMINISTRATION
 CONTRACT NO. D-179-C-1125

CIR	DOM	DATE	CIR#	CL	*STATION-CUT*		DISPOSAL-FILL		CHARACTER-OF-CUT-MATERIAL		***CHANNEL***			*****DITCH-PERFORMED*****			AMOUNT DREDGED CU-YDS				
					START	STOP	START	STOP	CLAY SAND SILT SHELL GR/L	%	%	AVERAGE DEPTH BEFORE AFTER	MLW	MLW	CUT- FT	WIDTH ADV. FT		PIPE FT	SHORE PIPE FT		
528	292	01NOV80	51	C	316+50	323+10	127+25	128+25	30	60	10	0	0	42.0	44.0	0	310	560	3810	25200	15156
529	300	02NOV80	51	C	323+10	329+00	129+00	130+00	30	60	10	0	0	42.0	44.0	0	320	0	3810	25200	0
530	301	03NOV80	51	N	286+10	287+35	130+00	130+00	30	60	10	0	0	15.0	30.0	0	270	125	2060	23100	15972
531	302	04NOV80	51	N	287+35	288+65	130+00	130+00	30	60	10	0	0	10.0	30.0	0	280	130	2260	23100	22148
532	303	05NOV80	51	N	289+65	290+65	132+00	132+00	40	10	10	0	0	10.0	30.0	0	280	170	2760	22050	17037
533	304	06NOV80	51	N	289+65	291+85	133+00	133+00	60	20	20	0	0	10.0	30.0	0	280	120	2510	22100	20444
534	305	07NOV80	51	N	290+85	291+95	133+50	133+50	60	20	20	0	0	10.0	30.0	0	280	110	2610	22050	18741
535	306	08NOV80	51	N	291+95	293+10	134+00	134+00	70	20	10	0	0	10.0	30.0	0	280	115	2610	22050	19592
536	307	09NOV80	51	N	293+10	294+10	134+50	134+50	70	20	10	0	0	10.0	30.0	0	280	110	2610	22050	18741
537	308	10NOV80	51	N	294+10	295+10	135+00	135+00	70	20	10	0	0	10.0	30.0	0	280	115	2610	22050	19592
538	309	11NOV80	51	N	295+10	296+10	135+50	135+50	70	20	10	0	0	10.0	30.0	0	280	110	2610	22050	18741
539	310	12NOV80	51	N	296+10	297+35	135+75	135+75	70	20	10	0	0	10.0	30.0	0	280	110	2610	22050	18741
540	311	13NOV80	51	N	297+35	297+75	135+75	135+75	70	20	10	0	0	10.0	30.0	0	280	110	2610	22050	18741
541	312	14NOV80	51	N	297+75	299+55	136+00	136+00	20	60	20	0	0	12.0	30.0	0	185	125	2810	22050	13333
542	313	15NOV80	51	N	299+55	302+05	136+25	136+25	20	60	20	0	0	12.0	30.0	0	185	125	2810	22050	13333
543	314	16NOV80	51	N	302+05	304+20	136+50	136+50	20	60	20	0	0	12.0	30.0	0	160	215	3260	22050	20385
544	315	17NOV80	51	N	304+20	306+75	136+75	136+75	10	70	20	0	0	12.0	30.0	0	155	255	3360	22050	23422
545	316	18NOV80	51	C	286+95	287+95	137+50	137+50	60	20	20	0	0	25.0	38.0	0	175	250	3360	22050	19444
546	317	19NOV80	51	C	287+95	289+65	138+50	138+50	60	20	20	0	0	30.0	38.0	0	375	170	3510	22050	18889
547	318	20NOV80	51	C	289+65	290+85	139+50	139+50	30	50	20	0	0	32.0	40.0	0	375	120	3410	22050	13333
548	319	21NOV80	51	C	290+85	292+60	140+50	140+50	50	50	20	0	0	31.5	40.0	0	375	175	3410	22050	17905
549	320	22NOV80	51	C	292+60	294+95	141+50	141+50	30	50	20	0	0	33.0	40.0	0	325	235	3810	22050	19801
550	321	23NOV80	51	C	294+95	296+45	142+50	142+50	30	50	20	0	0	32.0	40.0	0	325	230	3910	22050	16250
551	322	24NOV80	51	C	295+45	297+75	143+50	143+50	30	50	20	0	0	32.0	40.0	0	325	230	4150	22050	19380
552	323	25NOV80	51	C	297+75	301+35	144+00	144+00	30	50	20	0	0	32.5	39.0	0	325	260	4510	22050	21907
553	324	26NOV80	51	C	301+35	304+50	145+00	145+00	20	60	20	0	0	32.5	39.0	0	325	315	4810	22050	24646
554	325	27NOV80	51	C	304+50	307+50	146+50	146+50	20	60	20	0	0	33.0	39.0	0	325	310	5010	22050	21667
555	326	28NOV80	51	C	307+50	309+50	147+50	147+50	20	60	20	0	0	33.0	39.0	0	325	310	5010	22050	21667
556	327	29NOV80	51	C	309+50	312+50	148+50	148+50	20	60	20	0	0	38.0	43.0	0	325	370	3710	22050	19019
557	328	30NOV80	51	C	312+50	315+50	149+50	149+50	10	60	30	0	0	40.0	43.0	0	300	355	3710	22050	11833
558	329	01DEC80	51	C	315+50	318+50	150+50	150+50	10	60	30	0	0	40.0	43.0	0	300	355	4160	22050	16833

(continued)

Table B3 (continued)

CONTRACT NO. 31-72-C-1135

CIR	DATE	CIR	CL	STATION - (CUT - STOP)	DREDGAL - FILL	CHARACTER-OF-CUT--MATERIAL		**CHANNEL**		*****WORK-PERFORMED*****									
						CLAY	SAND	SILT	SHELL	%	AVERAGE DEPTH BEFORE	BANK WIDTH	CUT- ADV.	PIPE	PIPE	SHORE	AMOUNT DREDGED		
				START	STOP	%	%	%	M/W	FT	FT	FT	FT	FT	FT	CU-YDS			
51	558	7-2	310E C80	15+00	15+00	10	40	0	0	0	40.5	43.0	0	300	550	4810	22050	18056	
51	559	3-1	310E C80	15+00	15+00	10	40	30	0	0	41.0	43.0	0	300	550	4810	22050	18056	
51	560	3-1	310E C80	15+00	15+00	10	40	20	0	0	41.0	24.0	0	305	170	1010	18900	28806	
51	561	3-1	310E C80	15+00	15+00	10	40	20	0	0	41.0	27.0	0	275	135	3310	18900	28188	
52	562	3-1	310E C80	15+00	15+00	10	40	20	0	0	41.0	27.0	0	275	135	3110	18900	27330	
52	563	3-1	310E C80	15+00	15+00	10	40	20	0	0	41.0	27.0	0	275	122	3110	18900	24852	
52	564	3-1	310E C80	15+00	15+00	10	40	20	0	0	41.0	26.0	0	275	90	2860	17950	18333	
52	565	3-1	310E C80	15+00	15+00	10	40	20	0	0	41.0	26.0	0	290	145	3010	17950	31148	
53	566	3-1	310E C80	15+00	15+00	10	40	20	0	0	41.0	25.0	0	235	125	3160	17950	28681	
53	567	3-1	310E C80	15+00	15+00	10	40	5	0	0	41.0	25.0	0	295	105	3160	17950	25813	
53	568	3-1	310E C80	15+00	15+00	10	40	5	0	0	41.0	22.0	0	295	75	3360	17950	16389	
53	569	3-1	310E C80	15+00	15+00	10	40	5	0	0	41.0	22.0	0	295	75	2950	17950	18847	
54	570	3-1	310E C80	15+00	15+00	10	40	5	0	0	41.0	25.0	0	295	75	3360	17950	18847	
54	571	3-1	310E C80	15+00	15+00	10	40	5	0	0	41.0	26.0	0	295	70	3360	17950	18356	
54	572	3-1	310E C80	15+00	15+00	10	40	5	0	0	41.0	27.0	0	295	25	3360	17950	6829	
54	573	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	27.0	0	295	195	2450	5250	30319	
54	574	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	27.0	0	295	245	2530	5250	40153	
54	575	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	27.0	0	295	230	2530	5250	37694	
54	576	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	27.0	0	295	240	2730	5250	42611	
54	577	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	27.0	0	295	230	2730	5250	42720	
54	578	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	295	190	2730	5250	28500	
54	579	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	295	255	3040	5250	43431	
54	580	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	295	275	3045	5250	45069	
54	581	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	295	235	4300	5250	41081	
54	582	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	295	230	4300	5250	41956	
54	583	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	295	300	4600	5250	42611	
54	584	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	295	295	4900	5250	33577	
54	585	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	295	180	2275	5250	31557	
54	586	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	270	245	2275	5250	42104	
54	587	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	270	235	2175	5250	33950	
54	588	3-1	310E C80	15+00	15+00	10	40	10	0	0	41.0	26.0	0	290	255	2975	5250	30667	

(continued)

Table B3 (continued)

 DREDGE OF PATTERNS - PAGE 1135
 CONTRACT NO. 01-72-C-1135

CIR	ROW	DATE	CPEW	CL	STATION-CUT		DISPOSAL-FILL		CHARACTER-OF-CUT-MATERIAL		AVERAGE DEPTH		RANK WIDTH ADV.		FLOAT SHORE		AMOUNT
					START	STOP	START	STOP	CLAY SAND SILT SHELL GRVL	%	MLW	YLM	CUT-FT	PR-FT	PIPE-FT	PIPE-FT	
589	360	11JAN81	53	A	162+25	165+25	55+00	56+00	60	30	10	0	275	270	3425	5250	42778
590	361	2JAN81	53	N	165+25	167+75	57+00	59+00	60	30	10	0	270	270	3725	5250	40500
591	362	3JAN81	53	N	167+75	170+30	61+00	61+00	60	30	10	0	275	235	4125	5250	35903
592	363	4JAN81	53	N	170+30	172+55	63+00	63+00	60	30	10	0	275	225	4125	5250	34375
593	364	5JAN81	53	N	172+55	174+75	65+00	65+00	60	30	10	0	275	220	4325	5250	33611
594	365	6JAN81	53	N	174+75	175+55	67+00	67+00	60	30	10	0	275	220	4325	5250	33611
595	366	7JAN81	53	N	175+55	177+00	69+00	69+00	60	30	10	0	275	220	4325	5250	33611
596	367	8JAN81	53	N	177+00	179+00	71+00	71+00	60	30	10	0	275	220	4325	5250	33611
597	368	9JAN81	53	N	179+00	181+00	73+00	73+00	60	30	10	0	275	220	4325	5250	33611
598	369	10JAN81	53	N	181+00	183+00	75+00	75+00	60	30	10	0	275	220	4325	5250	33611
599	370	11JAN81	54	N	183+00	185+00	77+00	77+00	60	30	10	0	275	220	4325	5250	33611
600	371	12JAN81	54	N	185+00	187+00	79+00	79+00	60	30	10	0	275	220	4325	5250	33611
601	372	13JAN81	54	N	187+00	189+00	81+00	81+00	60	30	10	0	275	220	4325	5250	33611
602	373	14JAN81	54	N	189+00	191+00	83+00	83+00	60	30	10	0	275	220	4325	5250	33611
603	374	15JAN81	54	N	191+00	193+00	85+00	85+00	60	30	10	0	275	220	4325	5250	33611
604	375	16JAN81	53	N	193+00	195+00	87+00	87+00	60	30	10	0	275	220	4325	5250	33611
605	376	17JAN81	53	N	195+00	197+00	89+00	89+00	60	30	10	0	275	220	4325	5250	33611
606	377	18JAN81	54	N	197+00	199+00	91+00	91+00	60	30	10	0	275	220	4325	5250	33611
607	378	19JAN81	54	N	199+00	201+00	93+00	93+00	60	30	10	0	275	220	4325	5250	33611
608	379	20JAN81	54	S	201+00	203+00	95+00	95+00	60	30	10	0	275	220	4325	5250	33611
609	380	21JAN81	54	S	203+00	205+00	97+00	97+00	60	30	10	0	275	220	4325	5250	33611
610	381	22JAN81	54	S	205+00	207+00	99+00	99+00	60	30	10	0	275	220	4325	5250	33611
611	382	23JAN81	54	S	207+00	209+00	101+00	101+00	60	30	10	0	275	220	4325	5250	33611
612	383	24JAN81	52	S	209+00	211+00	103+00	103+00	60	30	10	0	275	220	4325	5250	33611
613	384	25JAN81	54	S	211+00	213+00	105+00	105+00	60	30	10	0	275	220	4325	5250	33611
614	385	26JAN81	52	S	213+00	215+00	107+00	107+00	60	30	10	0	275	220	4325	5250	33611
615	386	27JAN81	52	S	215+00	217+00	109+00	109+00	60	30	10	0	275	220	4325	5250	33611
616	387	28JAN81	52	S	217+00	219+00	111+00	111+00	60	30	10	0	275	220	4325	5250	33611
617	388	29JAN81	52	S	219+00	221+00	113+00	113+00	60	30	10	0	275	220	4325	5250	33611
618	389	30JAN81	52	S	221+00	223+00	115+00	115+00	60	30	10	0	275	220	4325	5250	33611
619	390	31JAN81	52	S	223+00	225+00	117+00	117+00	60	30	10	0	275	220	4325	5250	33611

(continued)

Table B3 (continued)

DEVELOPMENTAL - HAVE BLACKHOLE
 10-7-75

CWEA	CIR	DOR	DATE	*STATION-CUT*		DISPOSAL-FILL		CHARACTER-OF-CUT-TERMINA-				CLAY SAND SILT		%	**CHANNEL**		AVERAGE DEPTH		BANK WIDTH		CUT- PD		FLOAT SHORE		PIPE	DREDGED	CU-YDS	
				CL	CL	START	STOP	START	STOP	CL	CL	START	STOP		%	%	MLW	MLW	FT	FT	FT	FT	FT	FT				FT
52	620	391	01FEB81																									
52	621	392	02FEB81	C	154+00	154+90	10+00	10+00	16+00	16+00	65	30	5	0	0	0	0	39.0	0	385	70	0	0	1450	1320			0
52	622	403	03FEB81	C	154+90	153+70	13+50	13+50	10+50	10+50	65	55	5	0	0	0	0	39.0	0	385	480	0	0	1900	1460			30800
65	623	394	04FEB81	C	159+70	165+20	9+00	9+00	9+00	9+00	5	25	0	0	0	0	0	39.0	0	385	550	0	0	2200	1580			31370
65	624	395	05FEB81	C	165+20	171+20	19+00	19+00	19+00	19+00	5	25	0	0	0	0	0	39.0	0	385	550	0	0	2200	2920			29944
65	625	396	06FEB81	C	175+55	176+45	22+00	22+00	22+00	22+00	5	25	0	0	0	0	0	39.0	0	385	90	0	0	2200	3315			14937
65	626	397	07FEB81	C	176+45	171+55	22+00	22+00	22+00	22+00	70	30	0	0	0	0	0	25.0	0	267	210	0	0	2200	3315			26289
65	627	398	08FEB81	C	179+00	179+30	22+00	22+00	22+00	22+00	60	40	0	0	0	0	0	25.0	0	300	45	0	0	2200	3340			5000
65	628	709	09FEB81	C	173+30	181+10	22+00	22+00	22+00	22+00	70	30	0	0	0	0	0	10.0	0	275	180	0	0	2200	3390			31167
65	629	400	10FEB81	C	181+10	183+15	12+25	12+25	12+25	12+25	60	40	0	0	0	0	0	10.0	0	275	205	0	0	2400	3410			35495
65	630	401	11FEB81	C	183+15	185+35	02+50	02+50	02+50	02+50	30	70	0	0	0	0	0	10.0	0	275	220	0	0	2400	3450			38092
65	631	402	12FEB81	C	185+35	186+80	02+75	02+75	02+75	02+75	25	0	5	0	0	0	0	8.5	0	300	145	0	0	2600	3500			29806
65	632	403	13FEB81	C	173+15	173+95	02+00	02+00	02+00	02+00	25	0	5	0	0	0	0	22.0	0	180	140	0	0	2600	3500			23256
65	633	404	14FEB81	C	180+50	180+90	12+00	12+00	12+00	12+00	95	5	0	0	0	0	0	8.5	0	180	205	0	0	2025	2025			24591
65	634	405	15FEB81	C	180+90	183+70	12+00	12+00	12+00	12+00	85	10	5	0	0	0	0	9.0	0	180	280	0	0	2025	4815			33600
65	635	406	16FEB81	C	183+70	185+45	2+25	2+25	2+25	2+25	20	5	5	0	0	0	0	9.0	0	275	195	0	0	2025	4915			33764
65	636	407	17FEB81	C	185+45	187+55	2+75	2+75	2+75	2+75	20	5	5	0	0	0	0	9.0	0	280	190	0	0	2025	4965			33496
65	637	408	18FEB81	C	187+55	189+20	2+25	2+25	2+25	2+25	95	0	5	0	0	0	0	9.0	0	290	165	0	0	2325	5015			30128
65	638	409	19FEB81	C	192+20	192+20	2+50	2+50	2+50	2+50	90	5	15	0	0	0	0	10.0	0	275	300	0	0	2325	5140			36667
65	639	410	20FEB81	C	192+20	195+20	2+50	2+50	2+50	2+50	80	5	15	0	0	0	0	10.0	0	250	300	0	0	2625	3240			41667
65	640	411	21FEB81	C	195+20	197+95	2+75	2+75	2+75	2+75	80	5	15	0	0	0	0	10.0	0	250	275	0	0	2935	2115			38194
65	641	412	22FEB81	C	197+95	198+75	12+75	12+75	12+75	12+75	80	5	15	0	0	0	0	10.0	0	250	175	0	0	1060	2115			21860
65	642	413	23FEB81	C	191+45	183+45	2+90	2+90	2+90	2+90	40	5	15	0	0	0	0	26.0	0	250	270	0	0	1855	840			25926
65	643	414	24FEB81	C	183+45	185+75	5+50	5+50	5+50	5+50	45	5	10	0	0	0	0	26.0	0	250	180	0	0	1855	840			23333
65	644	415	25FEB81	C	195+25	196+30	10+00	10+00	10+00	10+00	25	0	5	0	0	0	0	26.0	0	250	155	0	0	1605	940			21528
65	645	416	26FEB81	C	186+80	186+50	3+00	3+00	3+00	3+00	25	0	5	0	0	0	0	26.0	0	250	170	0	0	1905	940			23611
65	646	417	27FEB81	C	188+50	190+25	13+00	13+00	13+00	13+00	95	0	5	0	0	0	0	24.0	0	285	175	0	0	2205	0			24370
65	647	418	28FEB81	C	187+50	189+40	13+00	13+00	13+00	13+00	25	0	5	0	0	0	0	10.0	0	300	215	0	0	2205	470			34326

(continued)

AD-A173 512

VERIFICATION OF DESIGN AND CONSTRUCTION TECHNIQUES FOR

3/5

GAILLARD ISLAND DR. (U) ARMY ENGINEER WATERWAYS

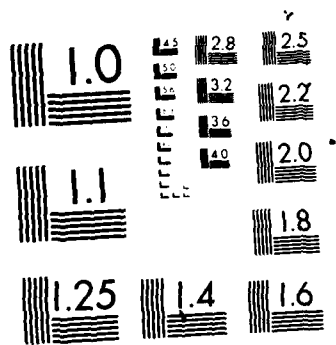
EXPERIMENT STATION VICKSBURG MS GOITE

UNCLASSIFIED

J FOWLER ET AL. AUG 86 WES/MP/GL-86-26

F/G 13/2

NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

OFFICE OF THE ATTORNEY GENERAL
STATE OF TEXAS
AUSTIN, TEXAS

(continued)

Table B3 (continued)

DRILLING OPERATIONS - DAVE BLACKBURN
CONTRACT NO. 01-70-C-0135

CIP	DUR	DATE	CREW	CL	*STATION-CUT*		DISPOSAL-FILL		CHARACTER-OF-CUT-MATERIAL			***CHAVE***			*****APK-PERFORMED*****			PIPE	SHORE	PIPE	PIPE	DREDGED	AMOUNT
					START	STOP	START	STOP	CLAY	SAND	SILT	SHELL	SP/L	AFTER	CUT-	BANK	WIDTH						
709	407	01MAY81	65	S	52+00	74+10	80+50	86+50	35	0	5	0	0	25.0	0	235	290	2745	580	37700			
710	481	02MAY81	65	S	70+10	76+25	83+00	89+00	35	0	5	0	0	25.0	0	235	285	2765	580	37050			
711	482	03MAY81	64	S	76+25	82+25	86+00	92+00	45	45	0	0	0	25.0	0	235	330	2675	580	43083			
712	483	04MAY81	65	S	72+05	84+05	90+00	96+00	45	45	0	0	0	25.0	0	235	330	2765	580	52222			
713	484	05MAY81	65	S	63+05	65+65	98+00	98+00	10	10	80	0	0	25.0	0	235	330	2665	580	43083			
714	445	06MAY81	65	N	75+00	76+00	102+00	102+00	30	30	40	0	0	25.0	0	235	275	2665	580	35903			
715	465	07MAY81	65	N	76+00	77+50	102+00	102+00	30	30	40	0	0	25.0	0	235	280	2665	590	36556			
716	487	08MAY81	65	N	73+50	81+30	103+00	103+00	25	25	50	0	0	25.0	0	235	250	2065	580	32639			
717	438	09MAY81	65	N	81+30	84+05	105+00	105+00	25	25	50	0	0	25.0	0	235	275	2665	580	35903			
718	489	10MAY81	65	N	84+05	86+15	107+00	107+00	25	25	50	0	0	25.0	0	235	275	2665	580	35903			
719	490	11MAY81	65	N	86+15	87+80	108+00	108+00	40	30	30	0	0	25.0	0	235	210	2865	580	27417			
720	444	12MAY81	65	N	87+30	91+25	109+00	109+00	40	30	30	0	0	25.0	0	235	145	3150	580	21541			
721	492	13MAY81	65	N	89+25	91+10	110+00	110+00	40	30	30	0	0	25.0	0	235	145	3005	580	18931			
722	493	14MAY81	65	N	91+10	93+50	111+00	111+00	46	30	30	0	0	25.0	0	235	240	3255	580	31333			
723	494	15MAY81	65	C	78+30	81+70	111+00	111+00	50	20	30	0	0	25.0	0	320	410	1905	580	27495			
724	495	16MAY81	65	C	91+70	84+15	112+00	112+00	90	0	10	0	0	40.0	0	380	545	2205	580	27233			
725	496	17MAY81	65	C	84+15	95+30	113+00	113+00	90	0	10	0	0	40.0	0	380	545	2205	580	27233			
726	497	18MAY81	65	C	95+30	103+15	114+00	114+00	90	0	10	0	0	40.0	0	380	545	2205	580	27233			
727	498	19MAY81	65	C	103+15	110+20	115+00	115+00	90	0	10	0	0	40.0	0	380	545	2205	580	27233			
728	499	20MAY81	65	C	110+20	113+40	116+50	116+50	90	0	10	0	0	40.0	0	380	545	2205	580	27233			
729	500	21MAY81	65	S	114+55	116+25	119+00	119+00	50	15	25	0	0	25.0	0	210	170	3310	580	22478			
730	501	22MAY81	65	S	116+25	119+45	119+50	119+50	50	15	25	0	0	25.0	0	210	170	3310	580	22478			
731	502	23MAY81	65	S	113+45	121+80	120+50	120+50	50	15	25	0	0	25.0	0	210	170	3310	580	22478			
732	503	24MAY81	65	S	120+80	124+50	123+50	123+50	50	15	25	0	0	25.0	0	210	170	3310	580	22478			
733	504	25MAY81	65	S	122+50	126+40	123+50	123+50	50	15	25	0	0	25.0	0	210	170	3310	580	22478			
734	505	26MAY81	65	S	124+50	126+40	123+50	123+50	50	15	25	0	0	25.0	0	210	170	3310	580	22478			
735	506	27MAY81	65	N	113+50	116+10	133+00	133+00	60	15	25	0	0	25.0	0	210	170	3310	580	22478			
736	507	28MAY81	65	N	114+10	116+25	136+00	136+00	60	15	25	0	0	25.0	0	210	170	3310	580	22478			
737	508	29MAY81	65	N	116+25	119+20	139+00	139+00	60	15	25	0	0	25.0	0	210	170	3310	580	22478			
738	509	30MAY81	65	N	113+20	119+20	140+00	140+00	60	15	25	0	0	25.0	0	210	170	3310	580	22478			
739	510	31MAY81	65	N	119+20	122+30	145+00	145+00	60	15	25	0	0	25.0	0	210	170	3310	580	22478			

(continued)

Table B3 (continued)

CONTRACT NO. 01-79-C-0135

CIR	DOR	DATE	CREW	CL	*STATION-CUT*		DISPOSAL-FILL		CHARACTER-OF-CUT**		ATEPIAL		***CHANNEL***		AVERAGE DEPTH		PARK WIDTH ADJ.		WORK-PERFORMED		PIPE	SHORE	PIPE	DREGGED	AMOUNT
					START	STOP	START	STOP	CLAY	SAND	SILT	SHELL	GR/L	%	MLW	MLW	REFORE	AFTER	CUT-	CUT+					
740	511	01JUN81	65	N	122+00	123+55	123+00	123+00	75	0	25	0	0	0	0	0	27.0	42.0	0	210	155	580	18083		
741	512	02JUN81	65	N	123+55	125+15	151+00	151+00	75	0	25	0	0	0	0	0	27.0	42.0	0	210	140	3055	580	18667	
742	513	03JUN81	65	N	125+15	126+75	152+00	152+00	75	0	25	0	0	0	0	0	27.0	42.0	0	210	160	3255	580	19667	
743	514	04JUN81	65	N	126+75	127+25	153+00	153+00	75	0	25	0	0	0	0	0	27.0	42.0	0	235	200	2455	580	15836	
744	515	05JUN81	65	N	114+50	115+30	155+00	155+00	90	0	10	0	0	0	0	0	42.0	43.5	0	300	540	2755	580	21644	
745	516	06JUN81	65	N	114+50	124+60	157+00	157+00	90	0	10	0	0	0	0	0	41.0	43.5	0	380	660	3855	580	23222	
746	517	07JUN81	65	N	75+00	73+75	73+00	73+00	50	0	50	0	0	0	0	0	25.0	40.0	0	235	320	1265	300	27779	
747	518	08JUN81	65	N	73+75	70+50	75+00	75+00	60	0	40	0	0	0	0	0	25.0	40.0	0	235	320	1465	425	42431	
748	519	09JUN81	65	N	70+50	66+50	73+00	73+00	60	0	40	0	0	0	0	0	25.0	40.0	0	235	350	1865	450	50917	
749	520	10JUN81	65	N	66+50	61+50	73+00	73+00	60	0	40	0	0	0	0	0	25.0	40.0	0	235	420	2365	450	52222	
750	521	11JUN81	65	N	62+60	59+35	73+00	73+00	60	0	40	0	0	0	0	0	25.0	40.0	0	235	325	2715	450	42431	
751	522	12JUN81	65	N	59+35	55+89	73+00	73+00	40	0	60	0	0	0	0	0	25.0	40.0	0	235	346	3165	450	45172	
752	523	13JUN81	65	N	55+89	52+35	73+00	73+00	40	0	60	0	0	0	0	0	25.0	40.0	0	235	354	3415	450	46217	
753	524	14JUN81	65	S	63+90	61+25	73+00	73+00	50	0	40	0	0	0	0	0	25.0	40.0	0	235	365	2520	450	47652	
754	525	15JUN81	65	S	61+25	56+35	74+00	74+00	30	0	70	0	0	0	0	0	27.0	40.0	0	235	490	3020	450	55443	
755	526	16JUN81	65	S	56+35	51+55	74+00	74+00	30	0	70	0	0	0	0	0	25.0	39.0	0	235	480	3420	450	58489	
756	527	17JUN81	65	C	78+30	74+15	74+00	74+00	25	0	75	0	0	0	0	0	25.0	39.0	0	320	550	1455	590	32222	
757	528	18JUN81	65	C	74+15	65+15	74+00	74+00	25	0	75	0	0	0	0	0	40.0	42.5	0	380	970	2255	600	31667	
758	529	19JUN81	65	C	65+15	57+55	74+00	74+00	25	0	75	0	0	0	0	0	39.5	41.5	0	320	750	1185	600	21393	
759	530	20JUN81	65	N	51+35	50+20	74+00	74+00	20	0	60	20	0	0	0	0	39.0	42.0	0	310	720	1585	600	26903	
760	531	21JUN81	65	N	50+20	47+00	74+00	74+00	20	0	60	20	0	0	0	0	28.0	40.0	0	200	320	1985	600	28444	
761	532	22JUN81	65	N	47+00	43+95	74+00	74+00	15	0	50	35	0	0	0	0	28.0	40.0	0	200	325	2385	600	27111	
762	533	23JUN81	65	N	43+95	40+80	75+00	75+00	15	0	50	35	0	0	0	0	27.0	40.0	0	200	315	2385	750	30303	
763	534	24JUN81	65	N	40+80	37+20	75+00	75+00	15	0	50	35	0	0	0	0	26.0	40.0	0	200	285	3315	410	27444	
764	535	25JUN81	65	N	37+20	34+15	73+00	73+00	15	0	50	35	0	0	0	0	26.0	39.0	0	225	380	3665	410	33250	
765	536	26JUN81	65	N	34+15	30+35	73+00	73+00	15	0	50	35	0	0	0	0	25.0	40.0	0	200	420	2160	410	41582	
766	537	27JUN81	65	S	41+15	41+15	73+00	73+00	25	0	75	0	0	0	0	0	27.0	39.0	0	230	420	2460	410	50089	
767	538	28JUN81	65	S	41+15	36+35	73+00	73+00	35	0	65	0	0	0	0	0	27.0	39.0	0	230	490	3310	410	49067	
768	539	29JUN81	65	C	51+35	50+35	73+00	73+00	40	0	60	0	0	0	0	0	40.0	42.0	0	305	540	1915	410	34112	
769	540	30JUN81	65	C	51+35	41+35	73+00	73+00	40	0	60	0	0	0	0	0	41.0	43.0	0	350	225	2965	410	39055	

(continued)

Table B3 (concluded)

 DREDGE OPERATIONS - DAVIS BEACH, ALA.
 CONTRACT NO. D-79-C-0135

CIR	DOR	DATE	CREW	CH	*STATION-CUT*		DISPOSAL-FILL	CHARACTER-OF-CUT-MATERIAL					**CHANNEL**		*****DIPK-PL FORMED*****		FLOAT	SHORE	PIPE	PIPE	CU-YDS	
					START	STOP		START	STOP	%	%	%	%	%	%	AVERAGE DEPTH						BEFORE
770	541	21JUL81	65	C	-41+60	33+35	83+50	93+50	30	70	0	0	0	0	29.5	30.0	0	305	270	3265	410	39240
771	542	22JUL81	65	S	32+65	28+25	108+50	108+50	30	60	0	0	0	0	29.5	39.0	0	280	440	2020	610	35607
772	543	23JUL81	65	S	28+25	38+20	115+50	115+50	30	65	0	0	0	0	29.9	39.0	0	230	515	2720	610	41298
773	544	24JUL81	66	S	23+20	44+15	108+50	138+50	35	65	0	0	0	0	30.6	40.0	0	225	505	3040	510	39558
774	545	25JUL81	65	S	14+55	14+55	83+50	83+50	30	70	0	0	0	0	31.0	40.0	0	270	450	3340	510	35267
775	546	26JUL81	65	N	32+50	29+40	83+50	83+50	35	65	0	0	0	0	30.5	40.0	0	240	445	1690	510	35212
776	547	27JUL81	65	N	29+40	24+50	83+50	83+50	30	70	0	0	0	0	29.4	39.0	0	270	470	2090	510	40071
777	548	28JUL81	65	N	24+50	20+15	83+50	83+50	35	65	0	0	0	0	29.4	39.0	0	230	435	2740	510	35573
778	549	29JUL81	65	N	20+15	15+20	83+50	83+50	35	65	0	0	0	0	31.0	40.0	0	225	425	3140	510	31875
779	550	30JUL81	66	C	-33+75	21+75	83+50	83+50	35	65	0	0	0	0	30.0	39.0	0	265	530	1940	510	31228
780	551	31JUL81	65	C	-30+75	22+70	83+50	83+50	30	70	0	0	0	0	30.0	42.0	0	380	405	2740	510	33980
781	552	12JUL81	65	C	22+70	16+30	83+50	83+50	35	65	0	0	0	0	40.0	43.0	0	380	441	3390	510	35467
782	553	13JUL81	65	C	14+30	13+85	109+00	109+00	40	60	0	0	0	0	40.0	43.0	0	250	285	1830	610	23583
783	554	14JUL81	65	N	11+30	7+10	109+00	109+00	40	60	0	0	0	0	30.0	40.0	0	240	370	1830	610	32889
784	555	15JUL81	65	N	7+10	4+25	109+00	109+00	40	60	0	0	0	0	34.0	40.0	0	235	480	1730	610	31989
785	556	16JUL81	66	C	9+20	7+50	109+00	109+00	40	60	0	0	0	0	30.0	40.0	0	280	250	2030	510	25556
786	557	17JUL81	65	S	7+50	5+00	83+50	83+50	40	60	0	0	0	0	26.0	39.0	0	225	160	2030	510	17333
787	558	18JUL81	65	S	5+00	3+40	83+50	83+50	40	60	0	0	0	0	27.0	40.0	0	200	360	1930	690	27541
788	559	19JUL81	65	S	3+40	2+55	83+50	83+50	40	60	0	0	0	0	26.0	38.0	0	310	210	2380	690	28933
789	560	20JUL81	65	S	5+25	3+15	83+50	83+50	40	60	0	0	0	0	25.0	39.0	0	150	475	2680	690	36944
790	561	21JUL81	65	S	3+15	-1+60	83+50	83+50	40	60	0	0	0	0	25.0	40.0	0	350	490	1730	690	35333
791	562	22JUL81	65	C	13+65	8+35	83+50	83+50	75	20	5	0	0	0	39.0	43.0	0	400	215	2130	690	35061
792	563	23JUL81	65	C	8+35	4+10	83+50	83+50	75	20	5	0	0	0	40.0	43.0	0	360	220	2040	690	34756
793	564	24JUL81	65	S	3+20	-1+70	109+00	109+00	70	20	5	0	0	0	40.0	43.0	0	390	140	1705	510	15044
794	565	25JUL81	65	C	7+10	5+50	83+50	83+50	20	80	0	0	0	0	41.0	43.0	0	390	215	2605	510	34200
795	566	26JUL81	65	C	5+40	4+45	83+50	83+50	20	80	0	0	0	0	41.0	43.0	0	380	25	3355	510	29852
796	567	27JUL81	65	C	4+45	3+20	83+50	83+50	20	80	0	0	0	0	41.0	43.0	0	380	120	3355	510	3378

Note: CIR - Contractors Inspection Report

DOR - Dredge Operation Report

CREW - Total Crew

CL - Center Line: S & N indicate work south or north of center line

STOCKS OUTSTANDING: 1,000,000

(continued)

(continued)

Table B4 (continued)

USE OF ATTENTION TABLE AND
CONTACT NO. 31-77-0-115

CER	REF	DATE	Q-EN	STATION-CUT	DISPOSAL-FILL	FLY	SAND	CLAY	SILT	WELL	SIZE	MATERIAL	AVERAGE DEPTH			MIN. RIM			MAX. RIM			AMOUNT DEPLETED CU-YDS
													FT	IN	CM	FT	IN	CM	FT	IN	CM	
621	42	1FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	90	2125	1075	1075	39000	
622	43	2FE081	53	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	153	2125	1075	1075	54000	
623	44	3FE081	53	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	55	2125	1075	1075	24444	
624	45	4FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	77	2175	910	910	34222	
625	46	5FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	43	2125	910	910	30222	
626	47	6FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	72	2025	910	910	27000	
627	48	7FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	400	2125	910	910	63667	
628	49	8FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	110	2175	910	910	37777	
629	50	9FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	20	2175	935	935	37111	
630	51	10FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	20	2175	925	925	21944	
631	52	11FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	59	2175	925	925	21111	
632	53	12FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	57	2175	985	985	22167	
633	54	13FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	74	2175	925	925	26556	
634	55	14FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	119	2125	985	985	47722	
635	56	15FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	158	2175	1050	1050	60944	
636	57	16FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	103	2175	1100	1100	42555	
637	58	17FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	124	2200	1125	1125	44334	
638	59	18FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	95	2175	1125	1125	30611	
639	60	19FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	145	2175	1125	1125	41500	
640	61	20FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	137	2175	1150	1150	45500	
641	62	21FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	74	2175	1150	1150	36167	
642	63	22FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	116	2175	1200	1200	43167	
643	64	23FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	95	2175	1200	1200	31500	
644	65	24FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	147	2175	1200	1200	36167	
645	66	25FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	200	2175	1025	1025	61833	
646	67	26FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	137	2175	1025	1025	45500	
647	68	27FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	34	2175	1025	1025	29000	
648	69	28FE081	52	85+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	71+00	20.0	0.0	0.0	30	94	2175	1025	1025	27833	

(continued)

Stacy, J. A. & N. J. B. 1997

(continued)

Table B5
Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-SIRT	CUT-STOP	FILL-SIRT	FILL-STOP	GEO-TECH CLAY SILT SAND	X'S	T1	CUBIC-YDS
VII	20CT79	132	-	-	25+50	26+50	0	0	13	4732
VII	30CT79	133	-	-	26+50	27+00	0	0	12	4368
VII	40CT79	134	-	-	27+00	27+50	0	0	10	3640
VII	50CT79	135	-	-	27+50	27+50	0	0	10	3640
VII	60CT79	136	-	-	27+50	27+75	0	0	11	4004
VII	70CT79	137	-	-	27+75	28+00	0	0	12	4368
VII	80CT79	138	349+00	-	28+00	-	0	0	60	2184
VII	90CT79	139	348+00	357+00	28+00	-	0	0	50	750
VII	100CT79	140	-	-	28+50	-	0	0	80	1200
VII	110CT79	141	-	-	28+50	-	0	0	11	1650
VII	11DEC79	202	-	-	31+00	31+50	0	0	70	3500
VII	12DEC79	203	-	-	31+50	31+75	0	0	50	2500
VII	13DEC79	204	-	-	32+00	32+25	0	0	70	3500
VII	14DEC79	205	-	-	32+25	32+50	0	0	70	3500
VII	15DEC79	206	-	-	-	-	0	0	40	2000
VII	16DEC79	207	-	-	-	-	0	0	12	6000
VII	17DEC79	208	-	-	32+50	33+00	0	0	90	4500
VII	18DEC79	209	-	-	38+00	-	0	0	90	4500
VII	19DEC79	210	-	-	33+00	33+50	0	0	10	5000
VII	20DEC79	211	-	-	34+00	34+50	0	0	70	3500
VII	21DEC79	212	-	-	35+00	36+00	0	0	13	6500
VII	22DEC79	213	-	-	36+00	-	0	0	10	5000
VII	23DEC79	214	-	-	38+00	-	0	0	13	6500
VII	24DEC79	215	-	-	38+00	-	0	0	10	5000
VII	26DEC79	217	-	-	38+00	-	0	0	30	1500
VII	27DEC79	218	-	-	39+00	-	0	0	30	720
VII	29DEC79	220	-	-	39+00	39+50	0	0	50	5400
VII	30DEC79	221	-	-	40+00	-	0	0	12	7200
VII	31DEC79	222	-	-	40+00	40+50	0	0	13	7800

(continued)

Table B5 (continued)

Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-STRT	CUT-STOP	FILL-STRT	FILL-STOP	GED-TECH CLAY SILT SAND	T1	QUEID-YD
VII	1JAN80	223	-	-	41+00	-	0	13	7800
VII	2JAN80	224	-	-	41+00	41+50	0	13	7800
VII	3JAN80	225	-	-	41+50	42+00	0	14	8400
VII	4JAN80	226	-	-	42+00	-	0	10	6000
VII	5JAN80	227	-	-	42+00	-	0	12	7200
VII	6JAN80	228	-	-	42+00	-	0	12	7200
VII	7JAN80	229	-	-	-	-	0	12	7200
VII	8JAN80	230	-	-	24+00	-	0	30	1800
VII	9JAN80	231	-	-	42+50	-	0	80	4800
VII	10JAN80	232	-	-	42+50	43+00	0	12	7200
VII	11JAN80	233	-	-	43+50	44+00	0	12	7200
VII	12JAN80	234	-	-	44+00	-	0	10	6000
VII	13JAN80	235	-	-	44+00	44+50	0	10	6000
VII	14JAN80	236	-	-	45+00	-	0	11	6600
VII	15JAN80	237	-	-	45+00	45+50	0	11	0
VII	16JAN80	238	-	-	45+50	-	0	80	4800
VII	17JAN80	239	-	-	45+50	-	0	80	4800
VII	18JAN80	240	-	-	45+50	46+00	0	50	3000
VII	19JAN80	241	-	-	46+00	-	0	12	7200
VII	20JAN80	242	-	-	47+00	47+50	0	90	5400
VII	21JAN80	243	-	-	47+50	-	0	17	10200
VII	22JAN80	244	-	-	-	-	0	14	8400
VII	27JAN80	249	-	-	47+50	47+50	0	30	1800
VII	28JAN80	250	-	-	48+00	-	0	18	10800
VII	29JAN80	251	-	-	49+50	-	0	19	11400
VII	30JAN80	252	-	-	60+00	-	0	16	9600
VII	31JAN80	253	-	-	60+00	-	0	70	4060

(continued)

Table B5 (continued)
Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-STRT	CUT-STOP	FILL-STRT	FILL-STOP	GEO-TECH CLAY SILT SAND	Z'S	T1	CUBIC-YDS
VII	1FER80	254	-	-	50+00	-	0	0	50	2900
VII	2FER80	255	-	-	61+00	-	0	0	15	8700
VII	3FER80	256	-	-	61+00	-	0	0	19	10000
VII	4FER80	257	-	-	61+00	-	0	0	17	8750
VII	5FER80	258	-	-	62+00	-	0	0	19	10500
VII	6FER80	259	-	-	62+00	-	0	0	16	8700
VII	7FER80	260	-	-	63+00	-	0	0	22	11900
VII	8FER80	261	-	-	64+00	-	0	0	27	14600
VII	9FER80	262	-	-	65+00	-	0	0	20	9400
VII	10FER80	263	-	-	68+00	-	0	0	16	7300
VII	11FER80	264	-	-	69+00	-	0	0	26	13100
VII	12FER80	265	-	-	69+00	-	0	0	23	12100
VII	13FER80	266	-	-	71+00	-	0	0	22	11100
VII	14FER80	267	-	-	71+00	-	0	0	19	9300
VII	15FER80	268	-	-	72+00	-	0	0	22	11320
VII	16FER80	269	-	-	73+00	-	0	0	19	9800
VII	17FER80	270	-	-	74+00	-	0	0	15	7800
VII	18FER80	271	-	-	74+00	-	0	0	27	10050
VII	19FER80	272	-	-	74+00	-	0	0	28	17000
VII	20FER80	273	-	-	75+00	-	0	0	20	12200
VII	21FER80	274	-	-	78+00	-	0	0	50	3100
VII	22FER80	275	-	-	81+00	-	0	0	13	7900
VII	23FER80	276	-	-	82+00	-	0	0	90	5400
VII	24FER80	277	-	-	82+00	-	0	0	10	5900
VII	25FER80	278	-	-	83+00	-	0	0	16	9600
VII	26FER80	279	-	-	83+00	-	0	0	15	8300
VII	27FER80	280	-	-	83+00	-	0	0	20	12200

(continued)

Table B5 (continued)

Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-STRT	CUT-STOP	FILL-STRT	FILL-STOP	CLAY	TECH SILT	%S SAND	T1	CUBIC-YDS
VII	3MAR80	285	-	-	86+00	-	0	0	0	90	5200
VII	4MAR80	286	-	-	86+00	-	0	0	0	20	12400
VII	5MAR80	287	-	-	98+00	-	0	0	0	25	14900
VII	6MAR80	288	-	-	98+00	-	0	0	0	20	11400
VII	7MAR80	289	-	-	91+00	-	0	0	0	11	6400
VII	8MAR80	290	-	-	92+00	-	0	0	0	50	2900
VII	9MAR80	291	-	-	99+00	-	0	0	0	15	8550
VII	10MAR80	292	-	-	100+00	-	0	0	0	17	10600
VII	11MAR80	293	-	-	101+00	-	0	0	0	13	8100
VII	12MAR80	294	-	-	101+00	-	0	0	0	10	5900
VII	13MAR80	295	-	-	102+00	-	0	0	0	21	11300
VII	14MAR80	296	-	-	100+00	-	0	0	0	20	12200
VII	15MAR80	297	-	-	98+00	-	0	0	0	10	9800
VII	16MAR80	298	-	-	97+00	-	0	0	0	13	8000
VII	17MAR80	299	-	-	-	-	0	0	0	80	5000
VII	20MAR80	302	-	-	95+00	-	0	0	0	13	7650
VII	21MAR80	303	-	-	94+00	-	0	0	0	18	10900
VII	22MAR80	304	-	-	88+00	-	0	0	0	20	11800
VII	23MAR80	305	-	-	83+00	-	0	0	0	22	13500
VII	24MAR80	306	-	-	75+00	-	0	0	0	22	13300
VII	25MAR80	307	-	-	70+00	-	0	0	0	29	11200
VII	26MAR80	308	-	-	69+00	-	0	0	0	21	12200
VII	27MAR80	309	-	-	66+00	-	0	0	0	22	13900
VII	28MAR80	310	-	-	62+00	-	0	0	0	18	10900
VII	29MAR80	311	-	-	60+00	-	0	0	0	20	11800
VII	30MAR80	312	-	-	70+00	-	0	0	0	12	7400
VII	31MAR80	313	-	-	73+00	-	0	0	0	13	9315

(continued)

Table B5 (continued)

Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-SIRT	CUT-STOP	FILL-START	FILL-STOP	GEO-TECH CLAY SILT SAND	%S	T1	CURIC-YDS
VII	1APR80	314	-	-	75+00	-	0	0	14	9900
VII	2APR80	315	-	-	77+00	-	0	0	13	9300
VII	3APR80	316	-	-	83+00	-	0	0	80	6000
VII	4APR80	317	-	-	88+00	-	0	0	13	9000
VII	5APR80	318	-	-	94+00	-	0	0	12	8800
VII	6APR80	319	-	-	98+00	-	0	0	90	6800
VII	7APR80	320	-	-	98+00	-	0	0	11	9300
VII	8APR80	321	-	-	98+00	-	0	0	40	3000
VII	9APR80	322	-	-	95+00	-	0	0	80	6000
VII	10APR80	323	-	-	94+00	-	0	0	13	9300
VII	11APR80	324	-	-	92+00	-	0	0	16	10600
VII	12APR80	325	-	-	90+00	-	0	0	14	9700
VII	13APR80	326	-	-	87+00	-	0	0	11	8100
VII	14APR80	327	-	-	84+00	-	0	0	13	9400
VII	15APR80	328	-	-	80+00	-	0	0	80	6000
VII	16APR80	329	-	-	78+00	-	0	0	13	9350
VII	17APR80	330	-	-	78+00	-	0	0	11	8250
VII	18APR80	331	-	-	77+00	-	0	0	10	7500
VII	20APR80	332	-	-	88+00	-	0	0	60	4500
VII	21APR80	334	-	-	77+00	-	0	0	11	8300
VII	22APR80	335	-	-	76+00	-	0	0	11	8300
VII	23APR80	336	-	-	74+00	-	0	0	12	9000
VII	24APR80	337	-	-	71+00	-	0	0	14	10500
VII	25APR80	338	-	-	69+00	-	0	0	23	13900
VII	26APR80	339	-	-	67+00	-	0	0	25	15300
VII	27APR80	340	-	-	60+00	-	0	0	24	15100
VII	28APR80	341	-	-	64+00	-	0	0	18	11800
VII	29APR80	342	-	-	69+00	-	0	0	20	12700
VII	30APR80	343	-	-	74+00	-	0	0	19	11750

(continued)

Table B5 (continued)

Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-STRT	CUT-STOP	FILL-STRT	FILL-STOP	CLAY	TECH SILT	2'S SAND	T1	CUBIC-YDS
VII	1MAY80	344	-	-	77+00	-	0	0	0	21	13500
VII	2MAY80	345	-	-	84+00	-	0	0	0	28	17500
VII	3MAY80	346	-	-	86+00	-	0	0	0	24	15750
VII	4MAY80	347	-	-	88+00	-	0	0	0	22	14300
VII	5MAY80	348	-	-	-	-	0	0	0	20	1300
VII	6MAY80	349	-	-	-	-	0	0	0	18	11200
VII	7MAY80	350	-	-	106+00	-	0	0	0	27	17650
VII	8MAY80	351	-	-	108+00	-	0	0	0	27	16700
VII	9MAY80	352	-	-	110+00	-	0	0	0	22	14700
VII	10MAY80	353	-	-	110+00	-	0	0	0	21	14700
VII	11MAY80	354	-	-	111+00	-	0	0	0	20	14400
VII	12MAY80	355	-	-	111+00	-	0	0	0	17	12600
VII	13MAY80	356	-	-	112+00	112+50	0	0	0	22	15500
VII	14MAY80	357	-	-	112+50	113+00	0	0	0	20	14000
VII	15MAY80	358	-	-	113+00	113+50	0	0	0	16	11000
VII	16MAY80	359	-	-	113+50	-	0	0	0	22	14900
VII	17MAY80	360	-	-	115+00	-	0	0	0	14	9500
VII	18MAY80	361	-	-	115+00	-	0	0	0	17	12400
VII	19MAY80	362	-	-	116+00	116+50	0	0	0	19	13600
VII	20MAY80	363	-	-	116+50	117+00	0	0	0	23	15800
VII	21MAY80	364	-	-	117+00	-	0	0	0	30	17100
VII	22MAY80	365	-	-	118+00	118+50	0	0	0	23	14100
VII	23MAY80	366	-	-	118+50	119+00	0	0	0	22	14500
VII	24MAY80	367	-	-	119+00	120+00	0	0	0	22	15500
VII	25MAY80	368	-	-	120+00	120+50	0	0	0	19	12700
VII	26MAY80	369	-	-	120+50	-	0	0	0	21	13700
VII	27MAY80	370	-	-	120+50	-	0	0	0	19	12700
VII	28MAY80	371	-	-	122+00	123+00	0	0	0	20	13800
VII	29MAY80	372	-	-	123+00	124+00	0	0	0	13	8900
VII	30MAY80	373	-	-	124+00	124+50	0	0	0	22	15300
VII	31MAY80	374	-	-	124+50	125+00	0	0	0	24	16400

(continued)

Table B5 (continued)

Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-START	CUT-STOP	FILL-START	FILL-STOP	GEO-TECH CLAY SILT SAND	T1	CUBIC-YDS
VII	1JUN80	375	-	-	125+00	126+00	0 0 0	22	15300
VII	2JUN80	376	-	-	126+00	127+00	0 0 0	21	14300
VII	3JUN80	377	-	-	127+00	128+00	0 0 0	26	16000
VII	4JUN80	378	-	-	128+00	128+50	0 0 0	28	17800
VII	5JUN80	379	-	-	128+50	-	0 0 0	24	14400
VII	6JUN80	380	-	-	130+00	131+00	0 0 0	21	13700
VII	7JUN80	381	-	-	131+00	-	0 0 0	22	14200
VII	8JUN80	382	-	-	133+00	-	0 0 0	24	15600
VII	9JUN80	383	374+00	374+00	134+00	134+00	60 30 10	13	8110
VII	10JUN80	384	373+00	373+00	136+00	136+00	60 30 10	16	8920
VII	11JUN80	385	372+00	372+00	137+00	137+00	60 30 10	17	9248
VII	12JUN80	386	372+00	372+00	137+00	137+00	60 30 10	11	6050
VII	13JUN80	387	371+00	371+00	139+00	139+00	60 30 10	12	7130
VII	14JUN80	388	371+00	371+00	140+00	140+00	60 30 10	15	8525
VII	15JUN80	389	371+00	371+00	141+00	141+00	60 30 10	16	9470
VII	16JUN80	390	372+00	372+00	141+00	141+00	60 30 10	16	8950
VII	17JUN80	391	372+00	372+00	142+00	142+00	60 30 10	10	5750
VII	18JUN80	392	373+00	373+00	142+00	142+00	60 30 10	16	9392
VII	19JUN80	393	373+00	373+00	143+00	143+00	60 30 10	15	7635
VII	20JUN80	394	373+00	373+00	144+00	144+00	60 30 10	20	10580
VII	21JUN80	395	374+00	374+00	148+00	148+00	60 30 10	19	9995
VII	22JUN80	396	374+00	374+00	149+00	149+00	60 30 10	15	7800
VII	23JUN80	397	374+00	374+00	150+00	150+00	60 30 10	20	9860
VII	24JUN80	398	374+00	374+00	151+00	151+00	60 30 10	13	6569
VII	25JUN80	399	374+00	374+00	152+00	152+00	60 30 10	15	7995
VII	26JUN80	400	374+00	374+00	153+00	153+00	60 30 10	15	7830
VII	27JUN80	401	374+00	374+00	154+00	154+00	60 30 10	12	6300
VII	28JUN80	402	374+00	374+00	154+00	154+00	60 30 10	21	10689
VII	29JUN80	403	374+00	374+00	154+00	154+00	60 30 10	19	9975
VII	30JUN80	404	373+00	373+00	156+00	156+00	60 30 10	18	8892

(continued)

Table B5 (continued)

Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-STRT	CUT-STOP	FILL-STRT	FILL-STOP	GEO-TECH 2'S	11	CUBIC-YDS
							CLAY SILT SAND		
VII	1JUL80	405	372+00	373+00	158+00	158+00	60 30 10	17	8500
VII	2JUL80	406	372+00	372+00	159+00	159+00	60 30 10	18	92522
VII	3JUL80	407	371+00	371+00	168+00	168+00	60 30 10	17	8823
VII	4JUL80	408	370+00	370+00	168+00	168+00	60 30 10	14	7434
VII	5JUL80	409	370+00	370+00	171+00	171+00	60 30 10	19	9880
VII	6JUL80	410	370+00	370+00	173+00	173+00	60 30 10	17	8908
VII	7JUL80	411	371+00	371+00	175+00	175+00	60 30 10	15	7800
VII	8JUL80	412	372+00	372+00	176+00	176+00	60 30 10	20	10180
VII	9JUL80	413	371+00	371+00	177+00	177+00	60 30 10	90	4905
VII	10JUL80	414	371+00	371+00	177+00	177+00	60 30 10	70	3500
VII	11JUL80	415	372+00	372+00	178+00	178+00	60 30 10	11	4300
VII	12JUL80	416	373+00	373+00	180+00	180+00	60 30 10	25	11300
VII	13JUL80	417	374+00	374+00	181+00	181+00	60 30 10	21	10200
VII	14JUL80	418	374+00	374+00	180+00	180+00	60 30 10	16	8326
VII	15JUL80	419	373+00	373+00	180+00	180+00	60 30 10	15	7710
VII	16JUL80	420	373+00	373+00	182+00	182+00	60 30 10	13	8624
VII	17JUL80	421	373+00	373+00	182+00	182+00	60 30 10	16	8576
VII	18JUL80	422	372+50	372+00	184+00	184+00	60 30 10	15	7695
VII	19JUL80	423	372+00	372+00	184+00	184+00	60 30 10	90	4650
VII	20JUL80	424	371+00	371+00	186+00	186+00	60 30 10	90	4437
VII	21JUL80	425	372+00	372+00	187+00	187+00	60 30 10	12	5276
VII	22JUL80	426	372+00	372+00	189+00	189+00	60 30 10	21	10773
VII	23JUL80	427	372+00	372+00	190+00	190+00	60 30 10	13	6556
VII	24JUL80	428	372+00	372+00	191+00	191+00	60 30 10	13	7008
VII	25JUL80	429	372+00	372+00	192+00	192+00	60 30 10	15	9145
VII	26JUL80	430	372+00	372+00	193+00	193+00	60 30 10	16	8288
VII	27JUL80	431	SE-TB	SE-TB	195+00	195+00	60 30 10	18	9520
VII	28JUL80	432	SE-TB	SE-TB	196+00	196+00	60 30 10	16	7460
VII	29JUL80	433	SE-TB	SE-TB	197+00	197+00	60 30 10	14	6900
VII	30JUL80	434	W-TB	SE-TB	198+00	198+00	60 30 10	18	6500
VII	31JUL80	435	S-TB	SE-TB	199+00	199+00	60 30 10	12	5870
VII	1AUG80	436	S-TB	SE-TB	199+00	199+00	60 30 10	15	7450
VII	2AUG80	437	S-TB	SE-TB	200+00	200+00	60 30 10	16	8400
VII	3AUG80	438	S-TB	SE-TB	200+00	200+00	60 30 10	15	7800
VII	4AUG80	439	SW-TB	SE-TB	-	-	60 30 10	14	6340
VII	5AUG80	440	SW-TB	SE-TB	-	-	60 30 10	70	2800
VII	6AUG80	441	SW-TB	SE-TB	-	-	60 30 10	90	3810
VII	7AUG80	442	SW-TB	SE-TB	-	-	60 30 10	20	1130

Table B5 (concluded)
Barge Haul Operation Combined

BARGE-TYPE	DATE	CIR-NR	CUT-STRT	CUT-STOP	FILL-STRT	FILL-STOP	GEO-TECH %'S CLAY SILT SAND	T1	CUBIC-YDS
VIII	9 JUN80	383	380+00	380+00	134+00	134+00	80 10 10	80	4990
VIII	10 JUN80	384	380+00	380+00	136+00	136+00	80 10 10	10	5580
VIII	11 JUN80	385	380+00	380+00	137+00	137+00	30 10 10	80	5352
VIII	12 JUN80	386	380+00	380+00	137+00	137+00	80 10 10	50	2750
VIII	13 JUN80	387	380+00	380+00	139+00	139+00	80 10 10	50	2970
VIII	14 JUN80	388	379+00	379+00	140+00	140+00	80 10 10	90	5175
VIII	15 JUN80	389	379+00	379+00	141+00	141+00	80 10 10	80	4730
VIII	16 JUN80	390	378+00	378+00	141+00	141+00	80 10 10	90	5040
VIII	17 JUN80	391	378+00	370+00	142+00	142+00	80 10 10	40	2310
VIII	18 JUN80	392	370+00	370+00	142+00	142+00	80 10 10	70	4108
VIII	19 JUN80	393	370+00	370+00	143+00	143+00	80 10 10	70	3565
VIII	20 JUN80	394	370+00	370+00	144+00	144+00	80 10 10	80	4220
VIII	21 JUN80	395	370+00	370+00	148+00	148+00	80 10 10	80	4205
VIII	22 JUN80	396	371+00	371+00	149+00	149+00	80 10 10	10	5200
VIII	23 JUN80	397	371+00	371+00	150+00	150+00	80 10 10	80	3940
VIII	24 JUN80	398	379+00	379+00	151+00	151+00	80 10 10	30	1531
VIII	25 JUN80	399	379+00	379+00	152+00	152+00	30 10 10	90	4805
VIII	26 JUN80	400	379+00	379+00	153+00	153+00	30 10 10	80	4170
VIII	27 JUN80	401	379+00	379+00	154+00	154+00	80 10 10	12	6300
VIII	28 JUN80	402	379+00	379+00	154+00	154+00	80 10 10	14	7111
VIII	29 JUN80	403	379+00	379+00	154+00	154+00	80 10 10	13	6825
VIII	30 JUN80	404	378+00	378+00	156+00	156+00	80 10 10	14	6908
VIII	1 JUL80	405	377+00	377+00	158+00	158+00	80 10 10	17	5500
VIII	2 JUL80	406	377+00	377+00	159+00	159+00	80 10 10	10	5148
VIII	3 JUL80	407	377+00	377+00	168+00	168+00	80 10 10	10	5177
VIII	4 JUL80	408	376+00	376+00	169+00	169+00	80 10 10	12	6366
VIII	5 JUL80	409	376+00	376+00	171+00	171+00	80 10 10	11	5720
VIII	6 JUL80	410	380+00	380+00	173+00	173+00	80 10 10	12	6292
VIII	7 JUL80	411	379+00	379+00	175+00	175+00	80 10 10	10	5200
VIII	8 JUL80	412	379+00	379+00	176+00	176+00	80 10 10	15	7715
VIII	14 JUL80	418	375+00	375+00	180+00	180+00	0 0 0	20	1104
VIII	15 JUL80	419	376+00	376+00	180+00	180+00	0 0 0	13	1104
VIII	16 JUL80	420	377+00	377+00	182+00	182+00	0 0 0	70	3776
VIII	17 JUL80	421	377+00	377+00	182+00	182+00	0 0 0	60	3224
VIII	18 JUL80	422	274+00	274+00	184+00	184+00	0 0 0	80	4105
VIII	19 JUL80	423	274+00	274+00	184+00	184+00	0 0 0	30	1650
VIII	20 JUL80	424	275+00	275+00	186+00	186+00	0 0 0	60	2963
VIII	21 JUL80	425	276+00	276+00	187+00	187+00	0 0 0	10	524

* Note: T1 - Number of barge loads

APPENDIX C: PERFORMANCE OF BARGE HAUL AND HYDRAULIC DREDGE OPERATIONS

Introduction

1. The performance of the barge haul and hydraulic dredge operation was evaluated based on the accumulative production rate in cubic yards versus days work. Further evaluation was made by dividing the effective time worked each day into the number of cubic yards of dredged material dredged each day. These values were then accumulated and plotted for each day of operation. This type of plot provides a better evaluation of production by each dredge or operation.

Barge haul operation

2. Accumulative cubic yards of dredged material versus days worked is shown plotted in Figure C-1. Effective time worked for this operation was not recorded. This plot shows all of the barge haul operation that was loaded from draglines located on the bank and from floating bucket dredges. This plot indicates that the barge haul operation was slow getting started but near the end of this operation two land based draglines and one floating bucket dredge made a considerable improvement in the amount of dredged material hauled to Gaillard Island. The linear portion of the curve beginning at about the 50th day represents the production rate of one dragline and one bucket dredge. Prior to this time only one dragline was working on the bank. The average production for the entire curve averaged about 9500 cu yd per day. All of the barge haul operation consisted of landcut dredged material. The total number of CIR records was 275 but there were only 237 days worked during this operation.

Jim Bean Dredge

3. Accumulative cubic yards of dredged material versus days worked is shown plotted in Figure C-2. The total cubic yards per day divided by the effective time in the dredge worked each day is shown accumulated and plotted versus the number of days worked in Figure C-3. The plot in Figure C-2 indicates the production rate for the Jim Bean Dredge averaged about 20,500 cubic yards of dredged material per day. Figure C-3 indicates that the Jim Bean dredge produced an average effective time production of 1277 cubic yards per hour per day.

Dave Blackburn Dredge

4. Figure C-4 shows a plot of accumulative cubic yards of dredged material versus days worked. Figure C-5 shows the total cubic yards of dredged material divided by the effective time worked each day and accumulated and plotted versus days worked. During the early phases of the contract the Dave Blackburn dredged primarily in the landcut portion of Theodore Ship Channel. Dredged material pumped these long distances from the landcut consisted of about 50 percent sand and 50 percent clay and silt with large quantities of clay balls forming in the dredge pipe. These materials were pumped at a production rate of about 17,000 cubic yards per day. Dredged material pumped from the Bay cut consisted of soft clays and silts with smaller amounts of sand and the production rate was considerably higher at about 28,400 cubic yards per day. Figure C-5 indicates that the Dave Blackburn produced an effective time production rate of about 1043 cubic yards per hour per day in the landcut materials and about 1433 cubic yards per hour per day in the bay-cut materials. The average production rate was about 1276 cubic yards per hour per day for the entire project which was about the same production indicated for the Jim Bean Dredge.

Lenel Bean Dredge

5. Figure C-6 shows a plot of the accumulative cubic yards of dredged material plotted versus days worked for the dust pan dredge Lenel Bean. The Lenel Bean dredged only the very soft baycut material in Theodore Ship Channel, where the pumping distances were always about the same; therefore, the dredge production rate was very linear and did not vary much during the time it spent in Theodore Ship Channel. The production rate for the Lenel Dredge was about 39,000 cubic yards of dredged material per day. The effective time production rate determined from Figure C-7 indicates that the Lenel was capable of pumping about 2800 cubic yards per hour per day.

Discussion

6. These production data indicate that the most productive dredge in the very soft bay clays was the Lenel Bean dredge at 39,000 cubic yards per day whereas the Dave Blackburn dredge averaged about 22,700 cubic yards per day for the land-cut and bay-cut combined. This production was only slightly better than the average production rate of the Jim Bean, 20,500 cubic yards per day. The extra booster pumps for the Dave Blackburn contributed to its better performance over the newer more powerful Jim Bean Dredge. Pumping

distances and dredged material consistency and type had a considerable influence on the production rates of each dredge. The Jim Bean and Dave Blackburn dredges averaged about the same effective time production rate of 1276 cubic yards per hour per day but the Lenel Bean Dredge was over twice this amount with about 2800 cubic yards per hour per day. Production rate of the barge haul operation was about 9500 cubic yards per day which was second to the Lenel Bean Dredge.

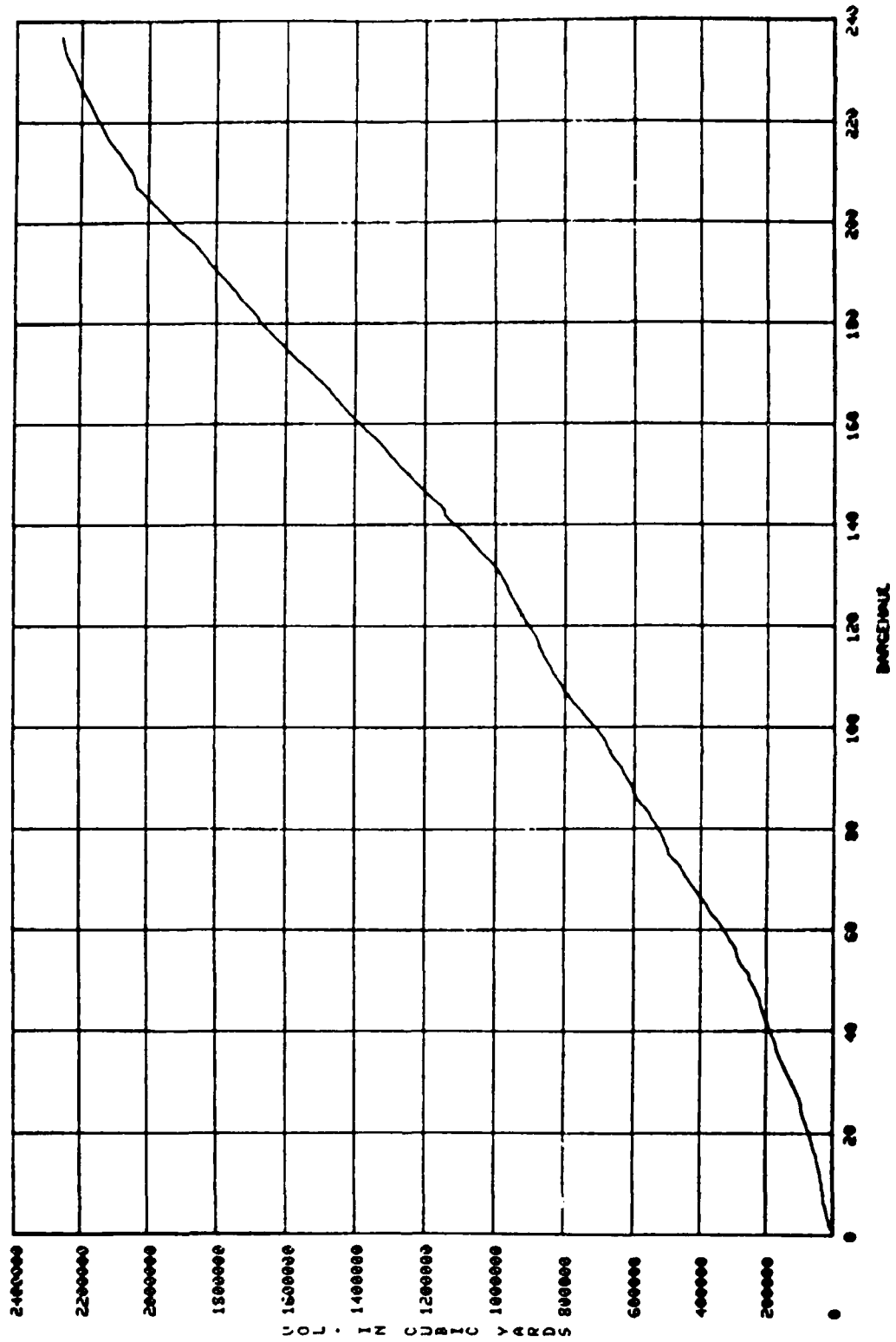


Figure C1. Accumulative cubic yards versus days worked for barge haul operation

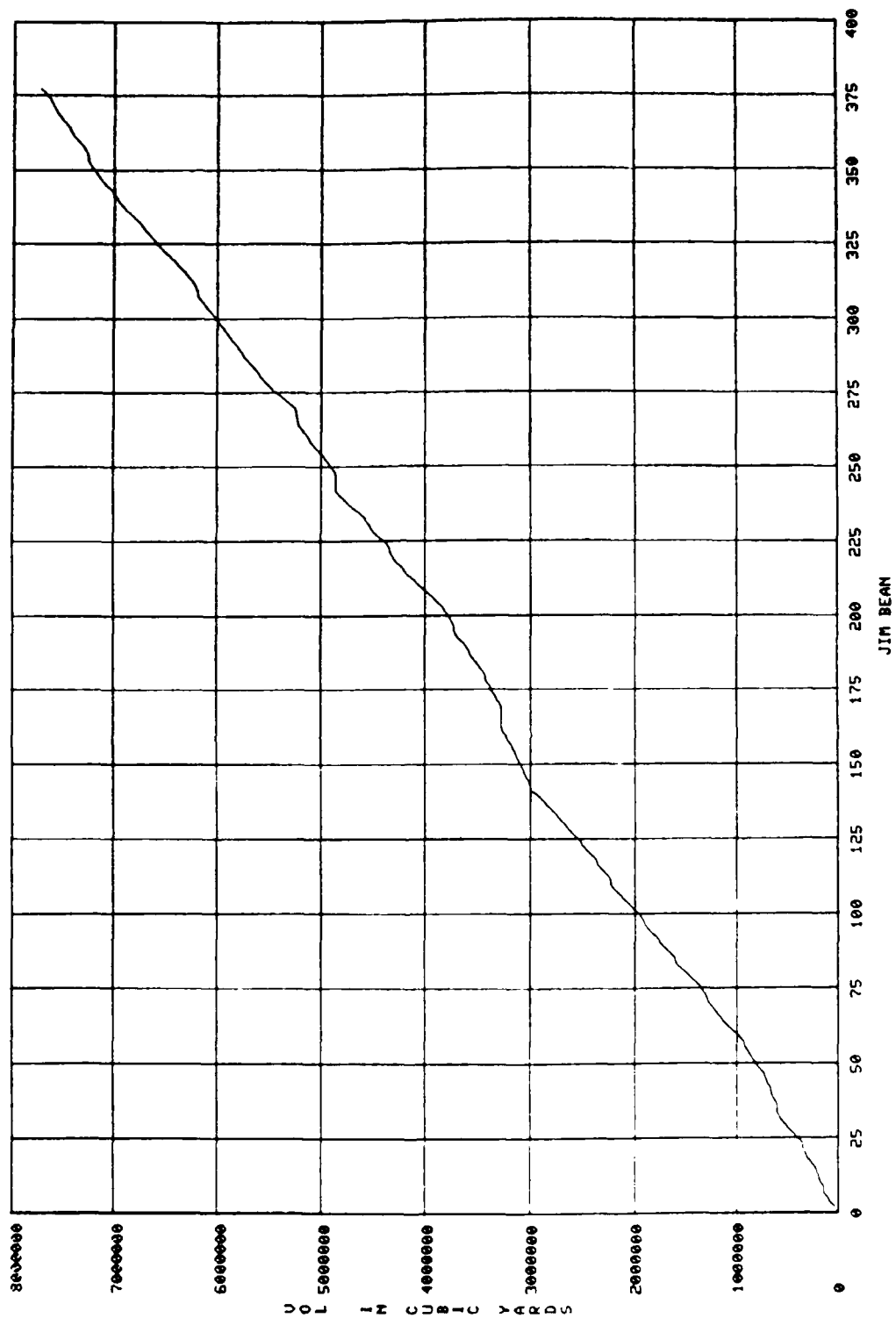


Figure C2. Accumulative cubic yards versus days worked for Jim Bean Dredge

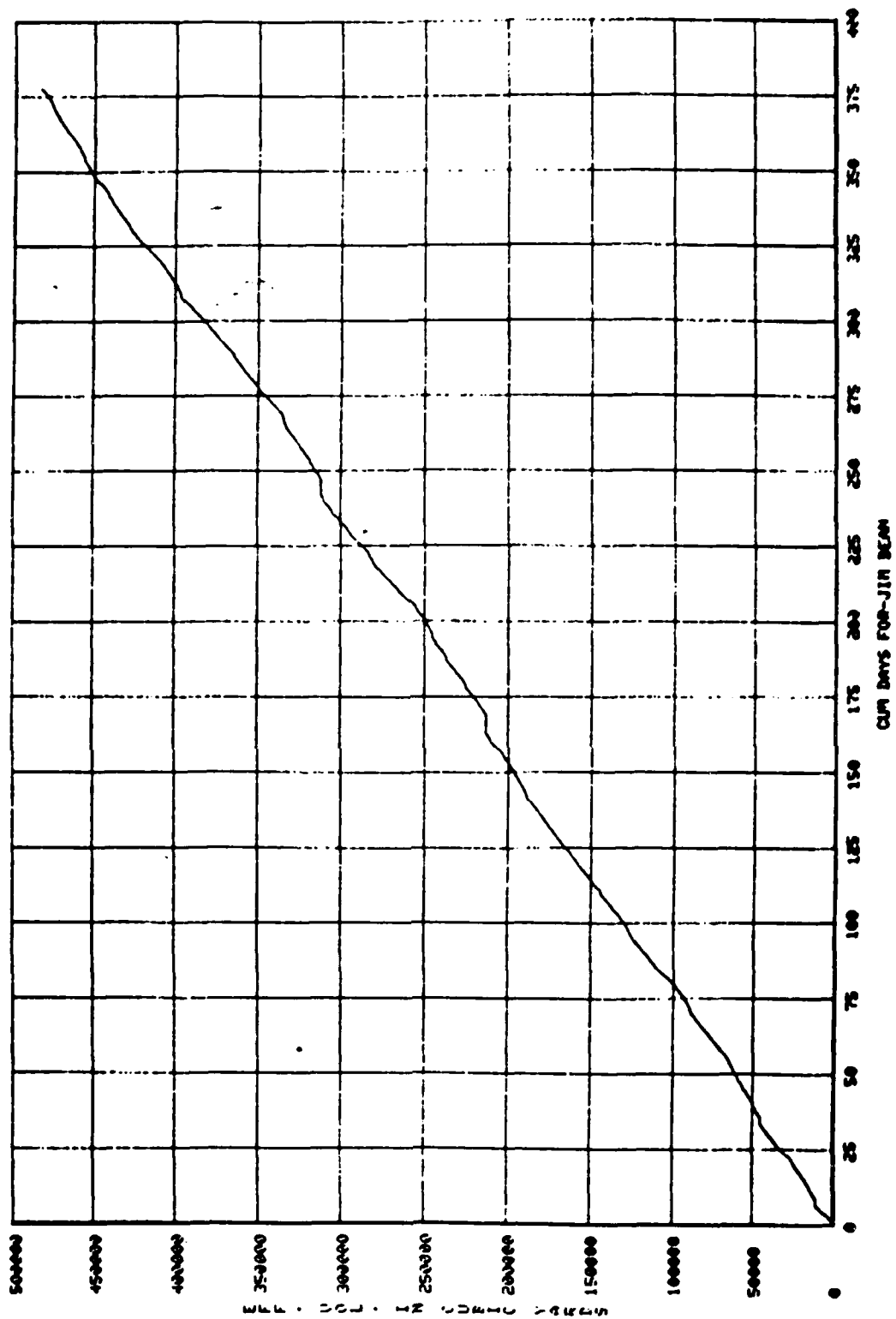


Figure C3. Accumulative cubic yards/effective time versus days worked for Jim Bean Dredge

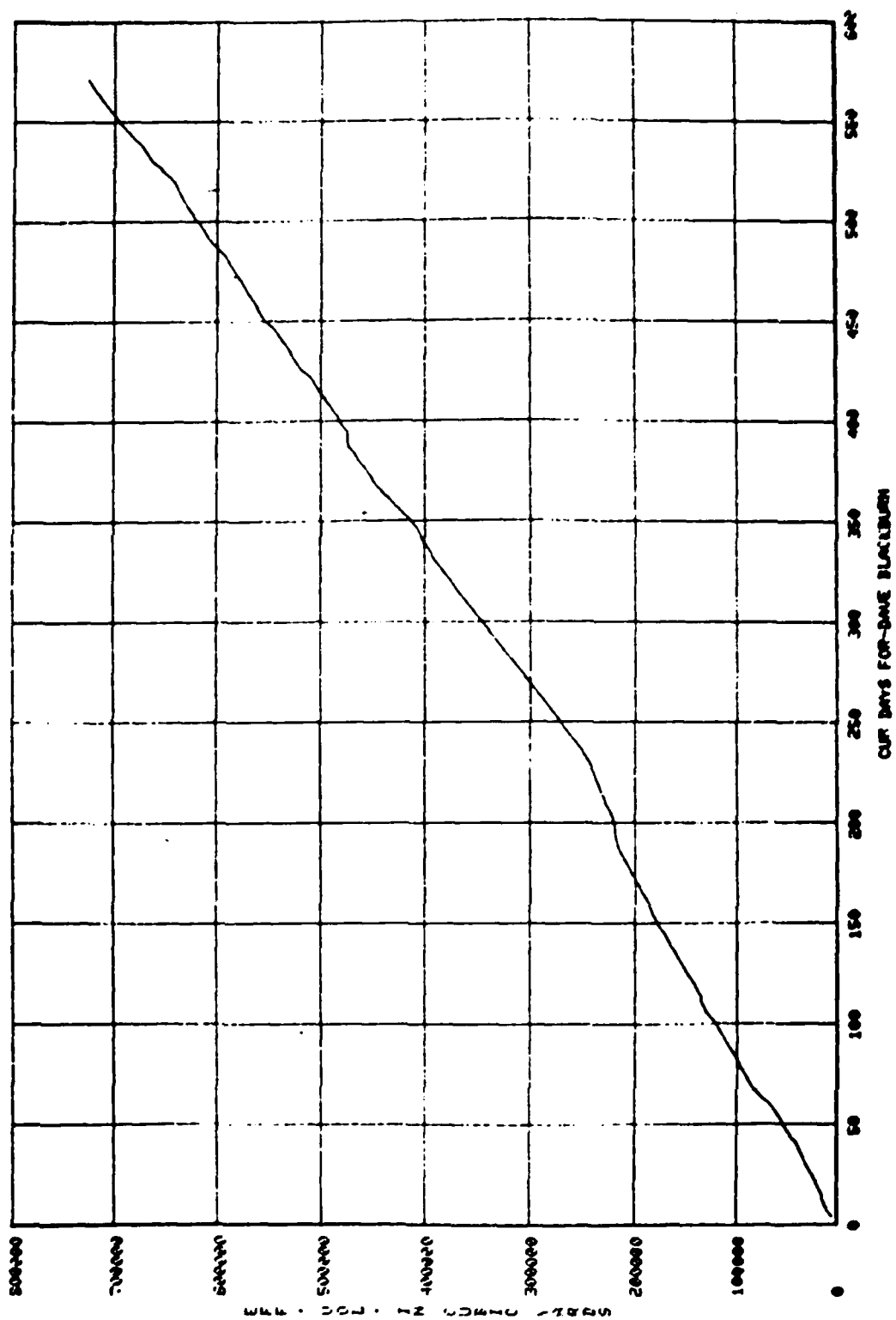


Figure C4. Accumulative cubic yards/effective time versus days worked for Dave Blackburn Dredge

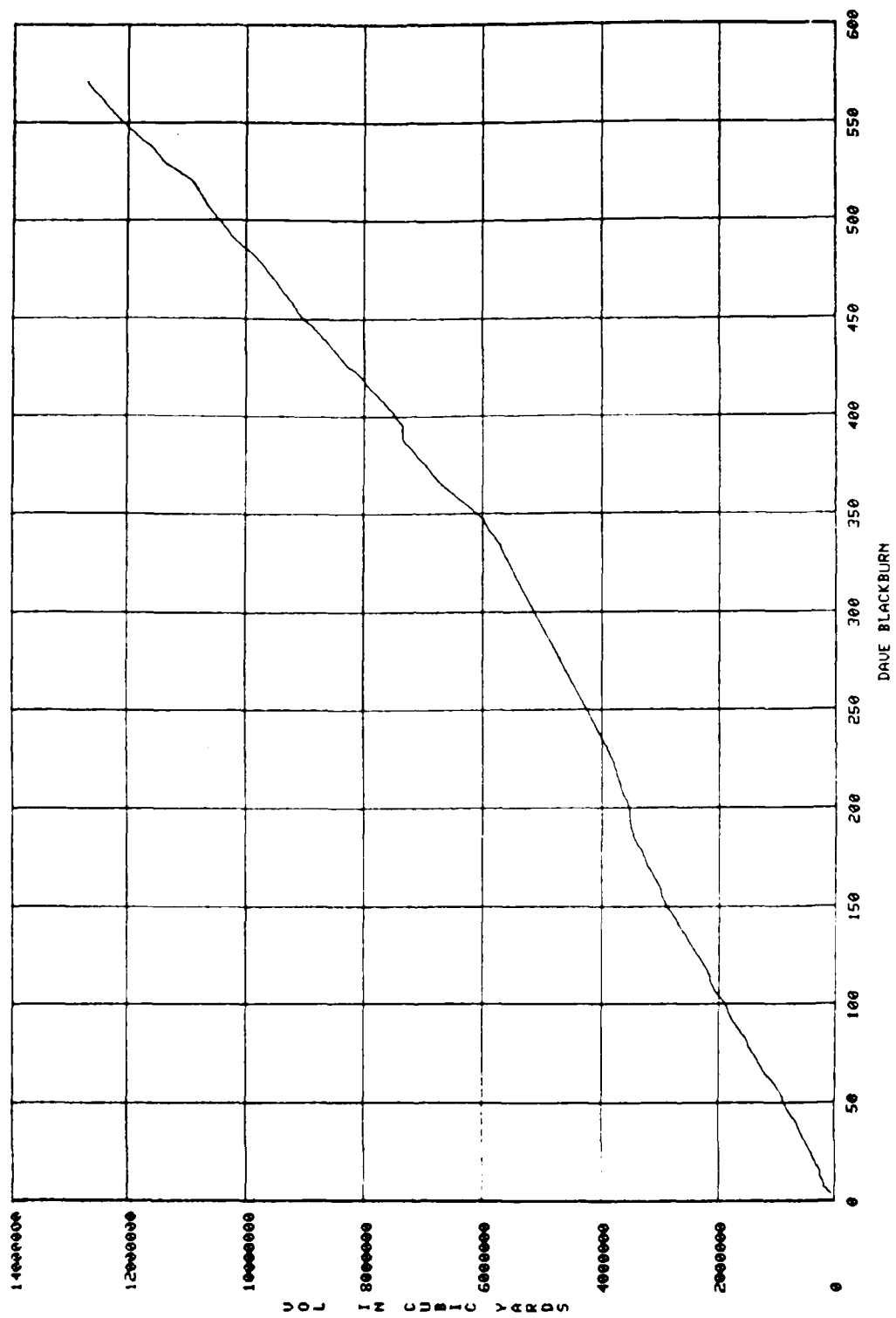


Figure C5. Accumulative cubic yards versus days worked for Dave Blackburn Dredge

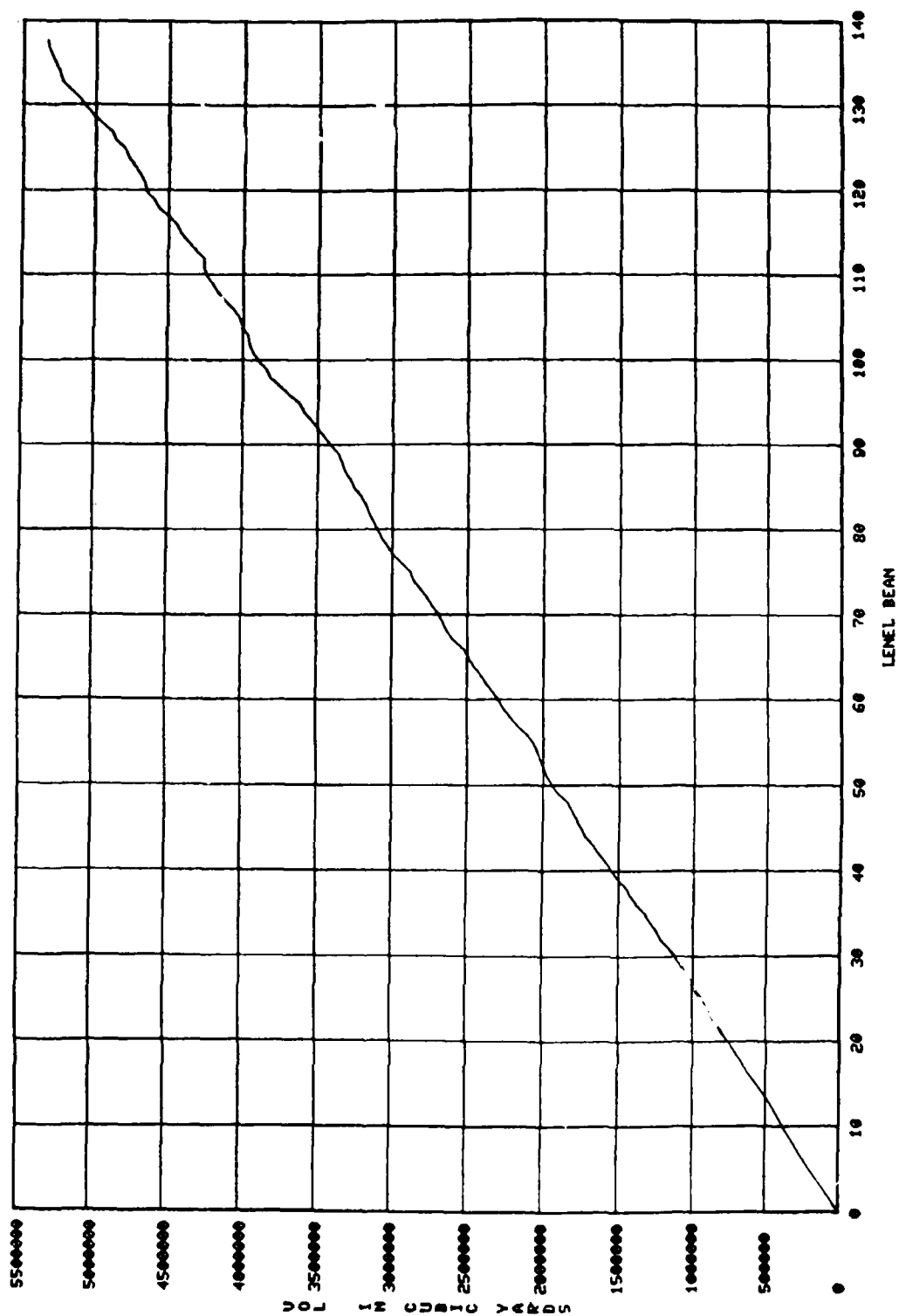


Figure C6. Accumulative cubic yards versus days worked for Lenel Bean Dredge

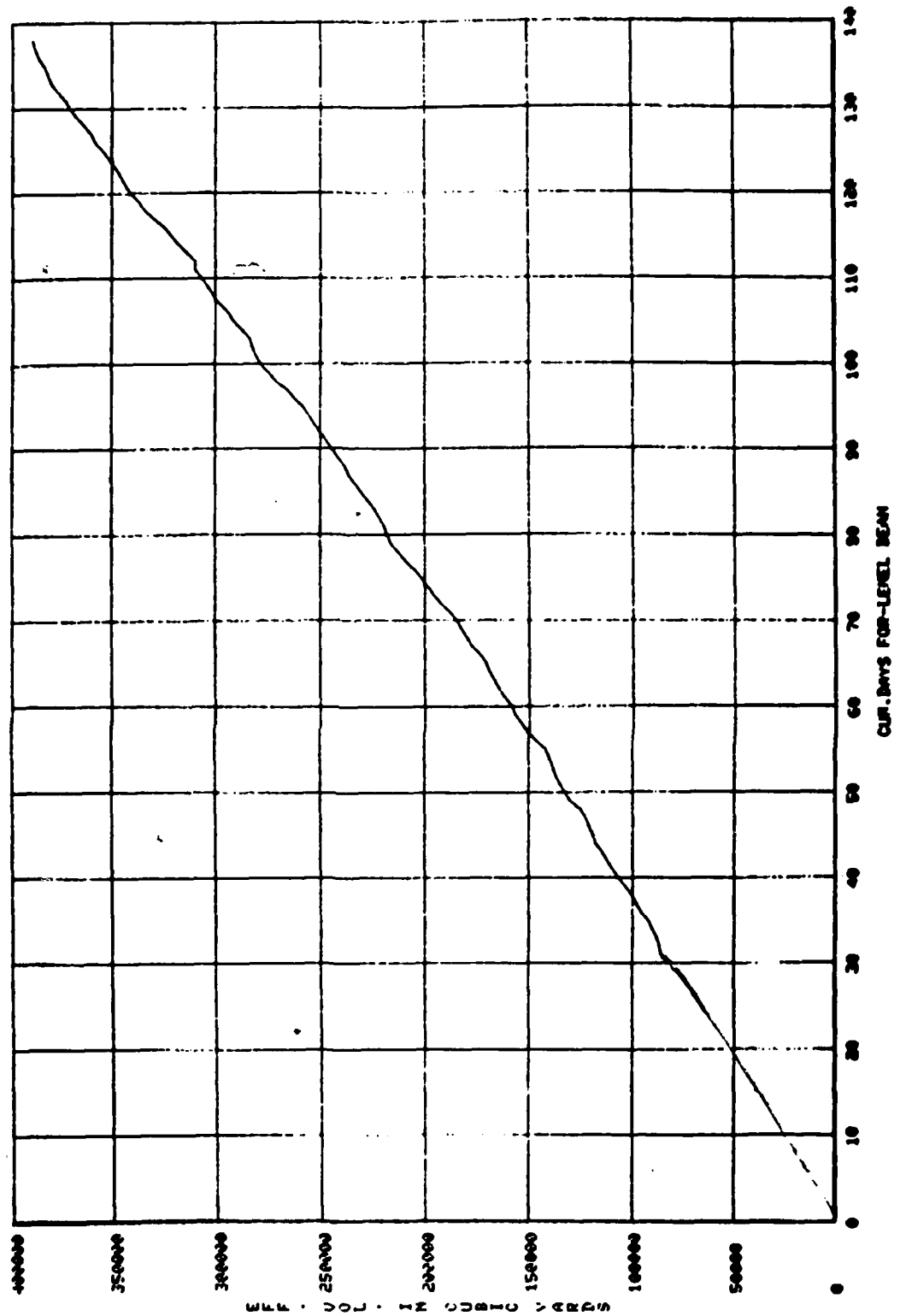


Figure C7. Accumulative cubic yards/effective time versus days worked for Lenel Bean Dredge

APPENDIX D: GAILLARD DISPOSAL ISLAND CONTAINMENT DIKE END-OF-CONSTRUCTION
CROSS SECTIONS

1. This appendix includes a total of 45 end-of-construction survey cross sections selected at various stations located along the dike alignment. Figure D1 shows the location of the cross sections and D2-D46 includes the cross sections selected. Boring logs were plotted on dike cross sections that were nearest to boring log station. Standard split spoon blow counts, Atterberg limits and water contents will be provided by the Mobile District in their report review. (Per telephone conversation with Johnnie Taylor).

TABLE OF CONTENTS

<u>Title</u>	<u>Figure</u>
Cross Section Location Map	D1
Cross Sections	D2 - D46

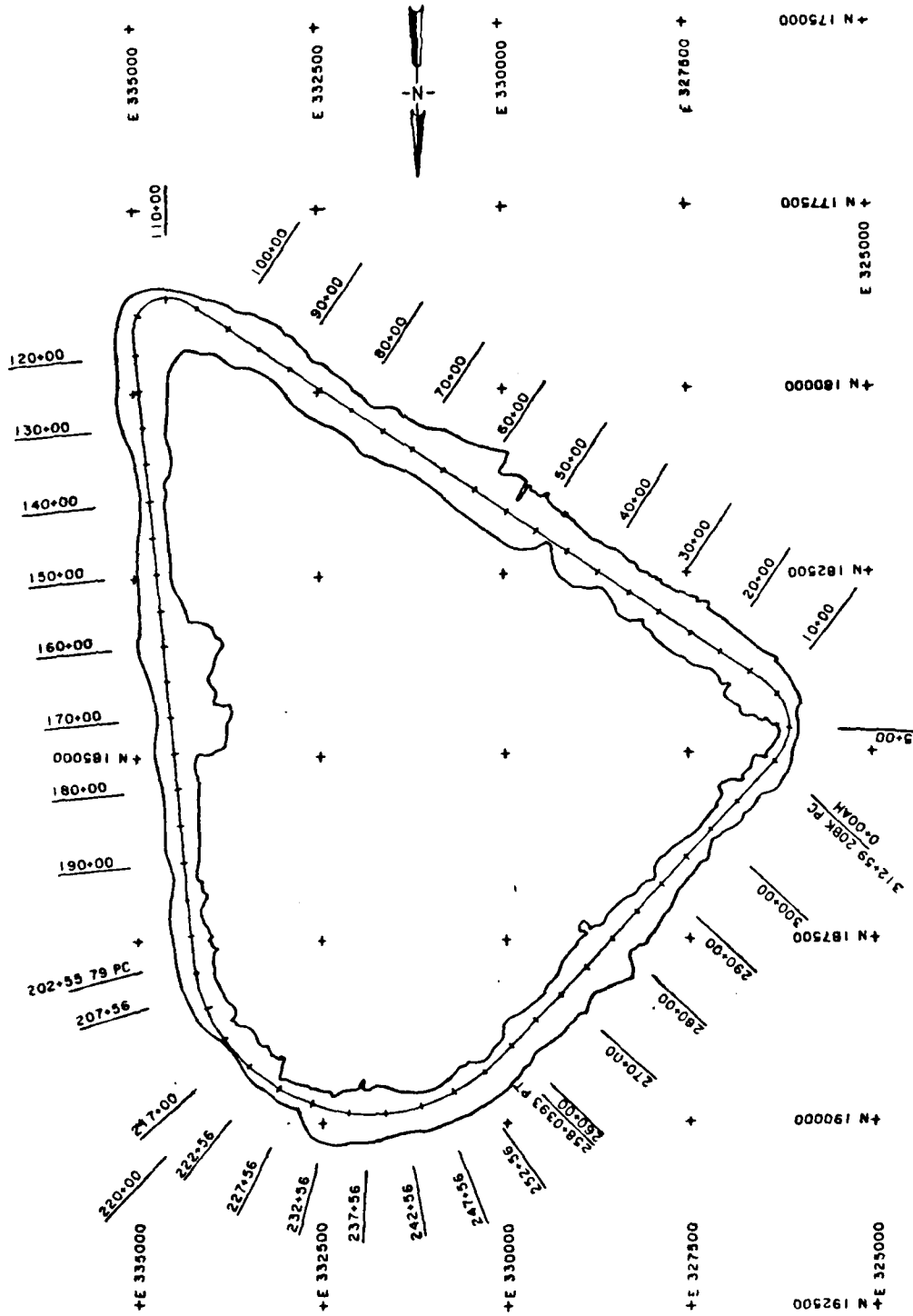
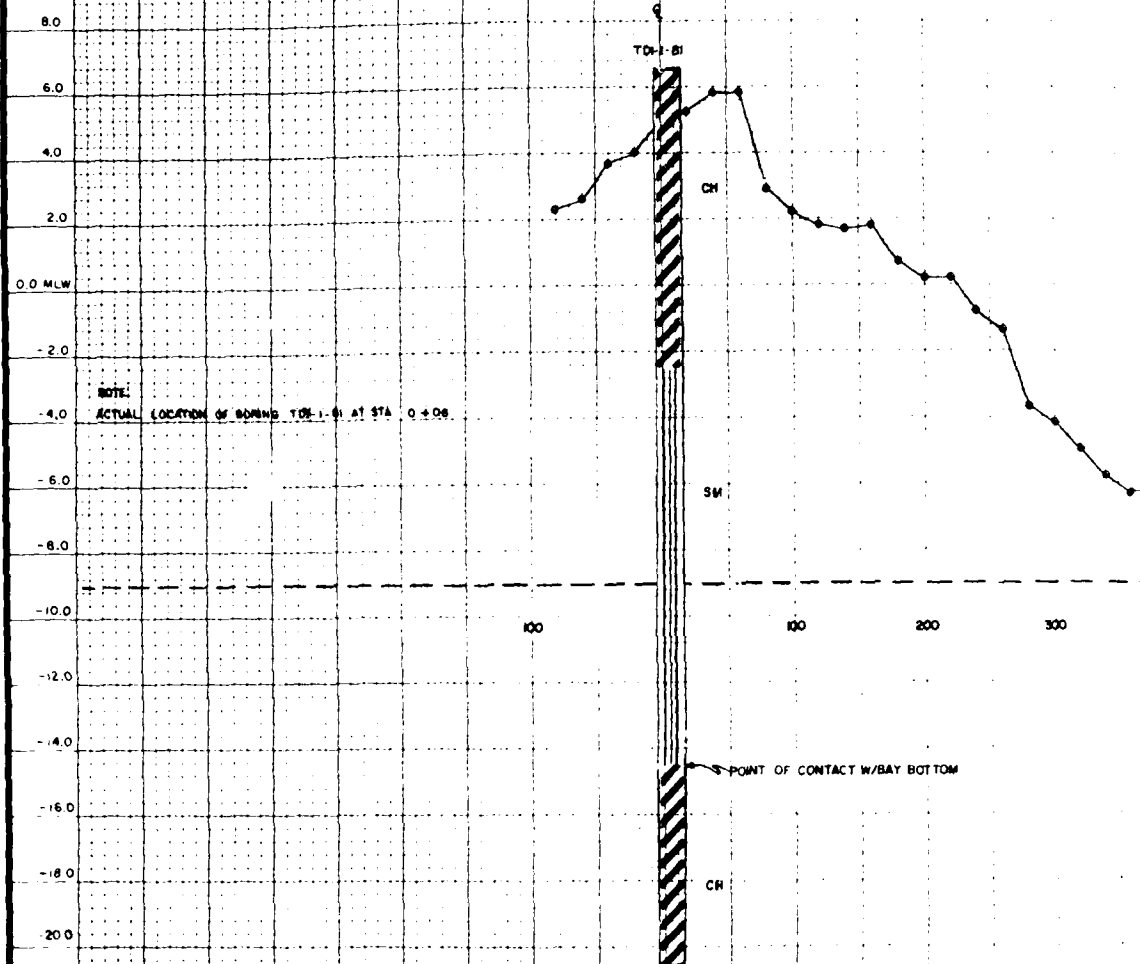


Figure D1. Location map for end of construction cross sections for Figures D2 through D46

STATION 0+00



SYN ZONE

REVIEWS

DISCUSSION

MT

Abstract

ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY
EN-FS

DATE: 10/10/99

SECRET

10. 2008 年 12 月 31 日

Dr. 24.1.15

U. S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
MOBILE, ALA.

GAILLARD DISPOSAL ISLAND
END OF CONSTRUCTION

CROSS SECTIONS

Dr. 24.1.15

[illegible]

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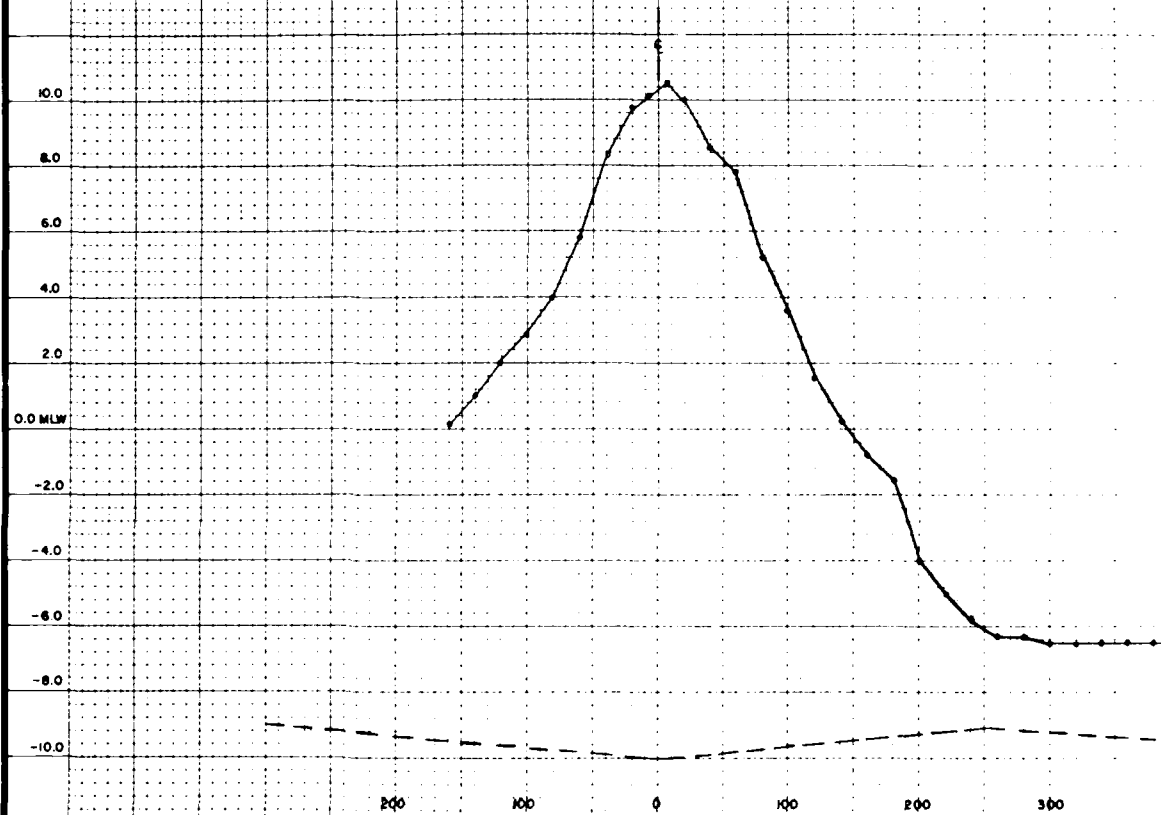
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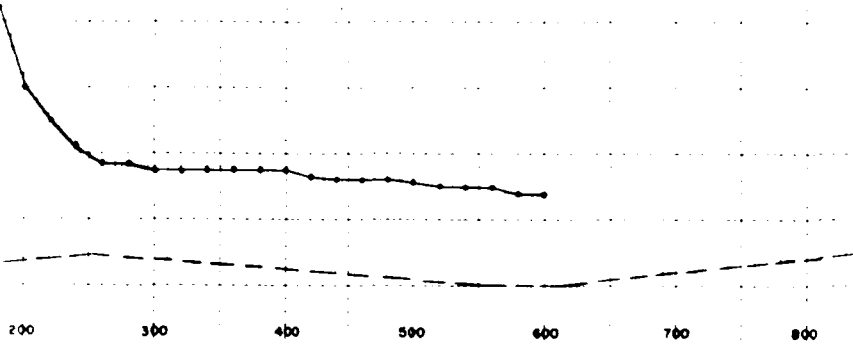
DATE **AUGUST 196**

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STATION 5+00



STATION 5+90

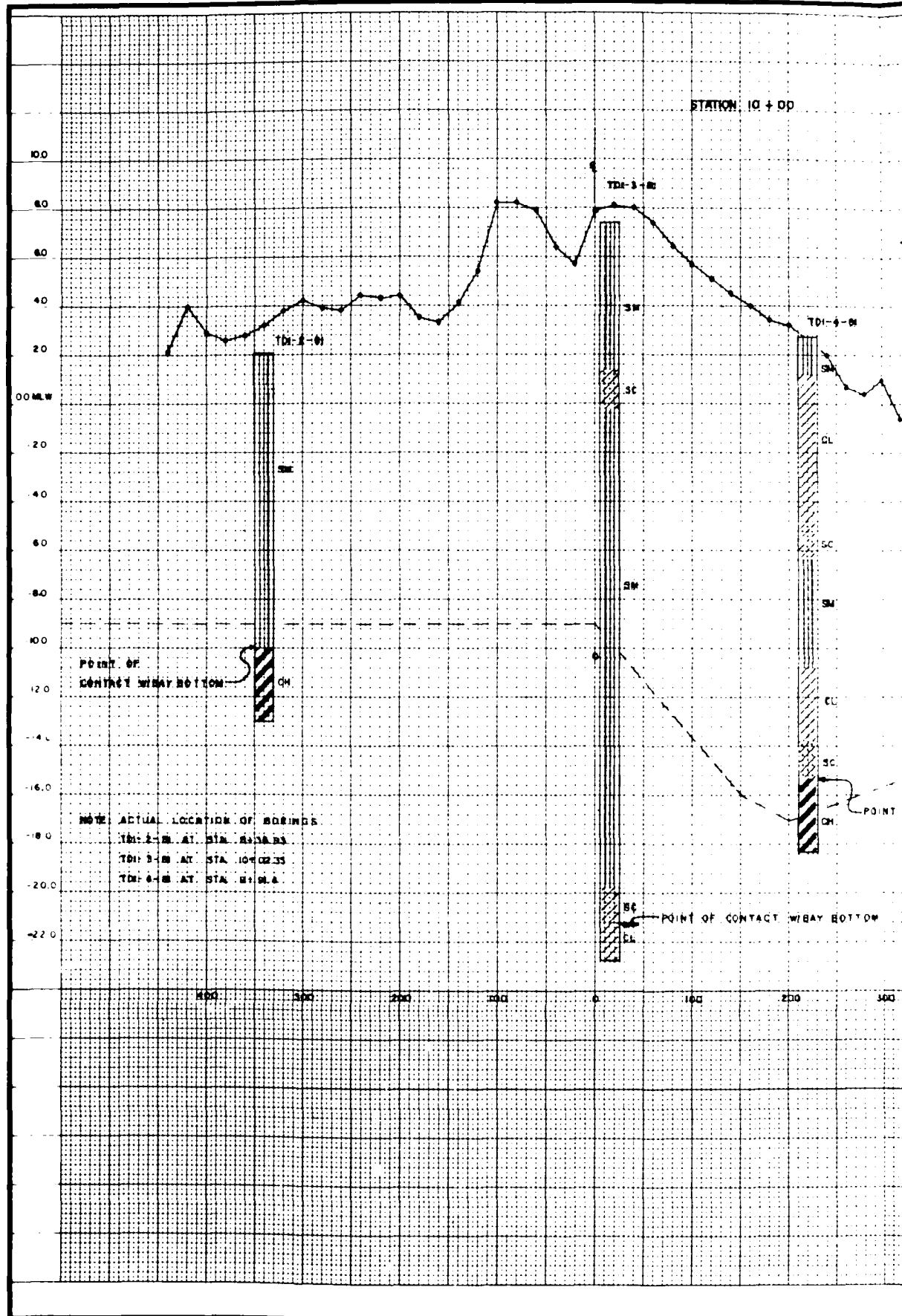


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DRAWN BY	GAILLARD DISPOSAL ISLAND END-OF CONSTRUCTION		
CHECKED BY	CROSS SECTIONS		
SUPERVISED BY	DATE	SCALE	REVISIONS
	AUGUST 1981		2 OF 43

Figure D3



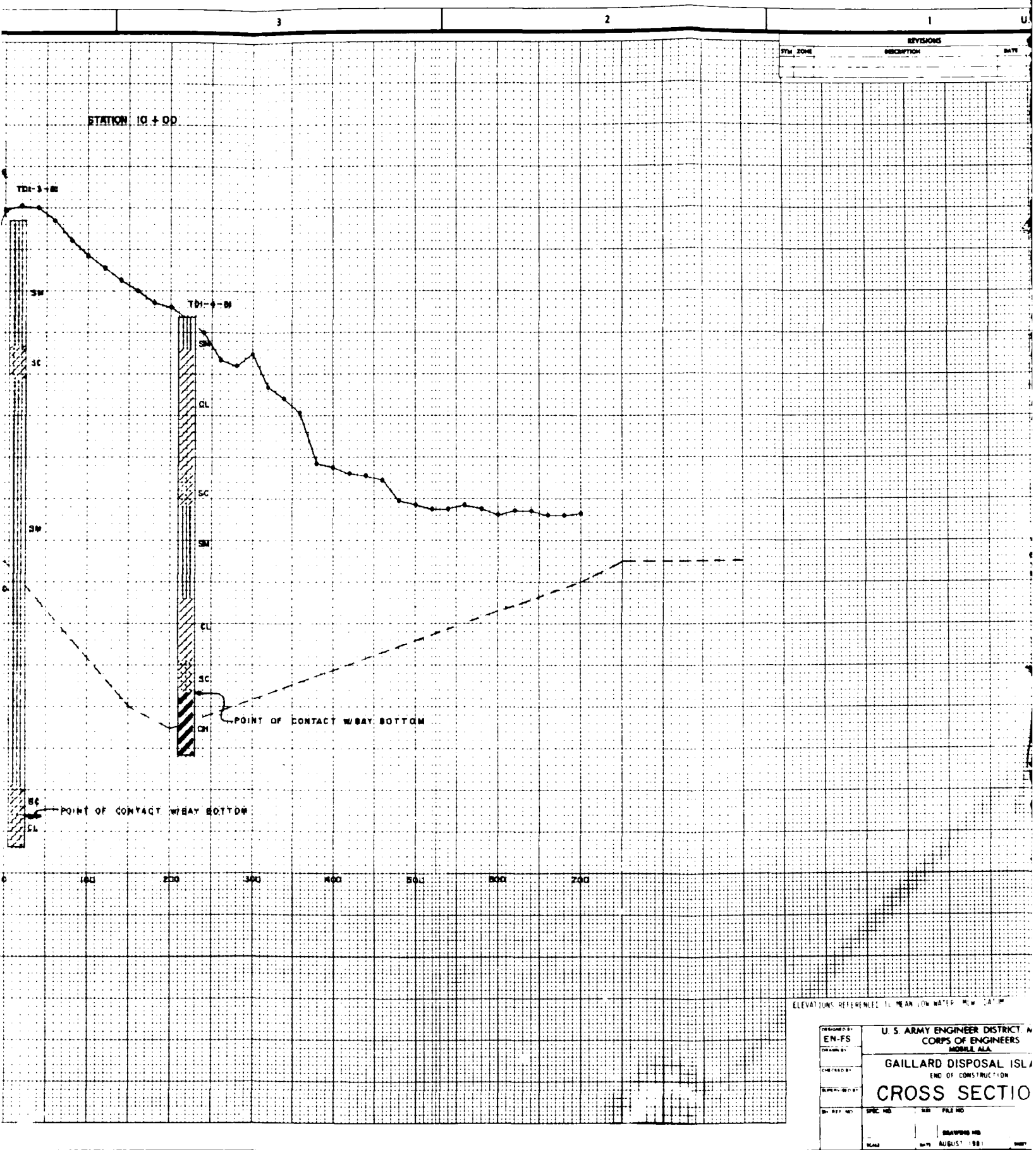
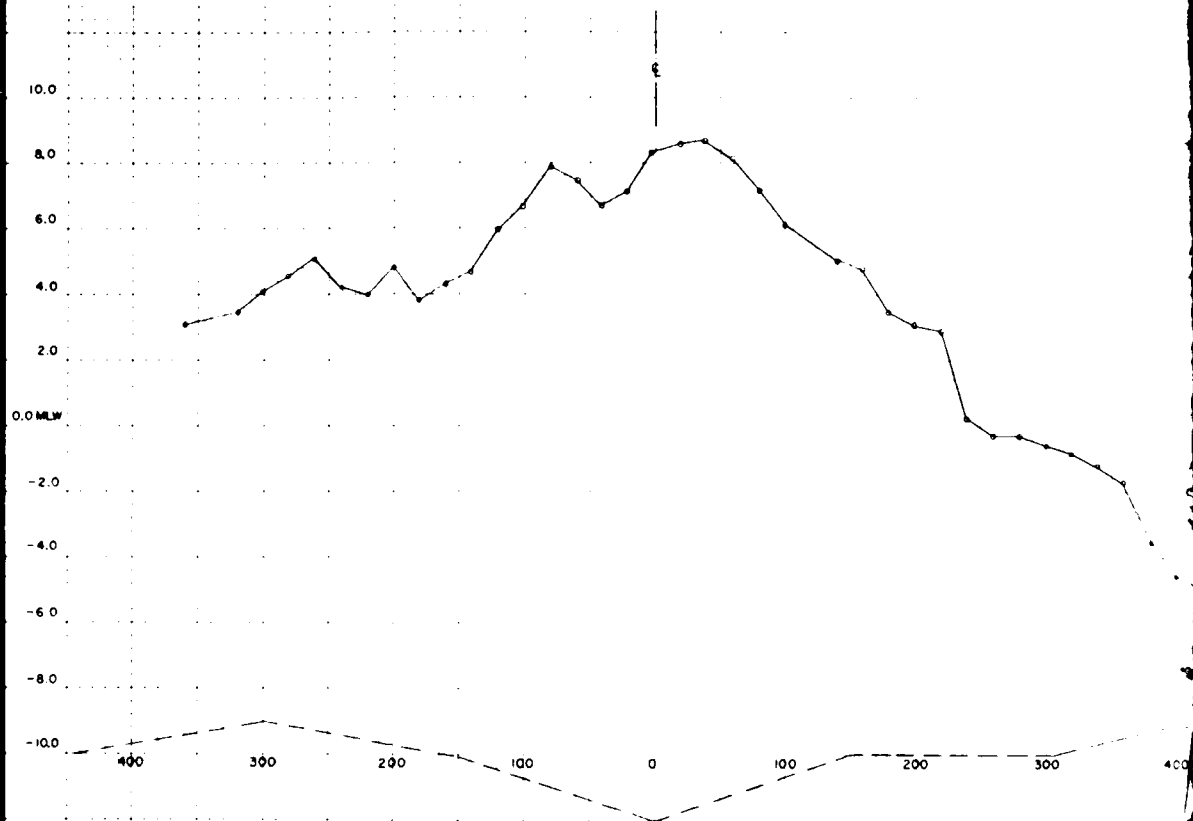


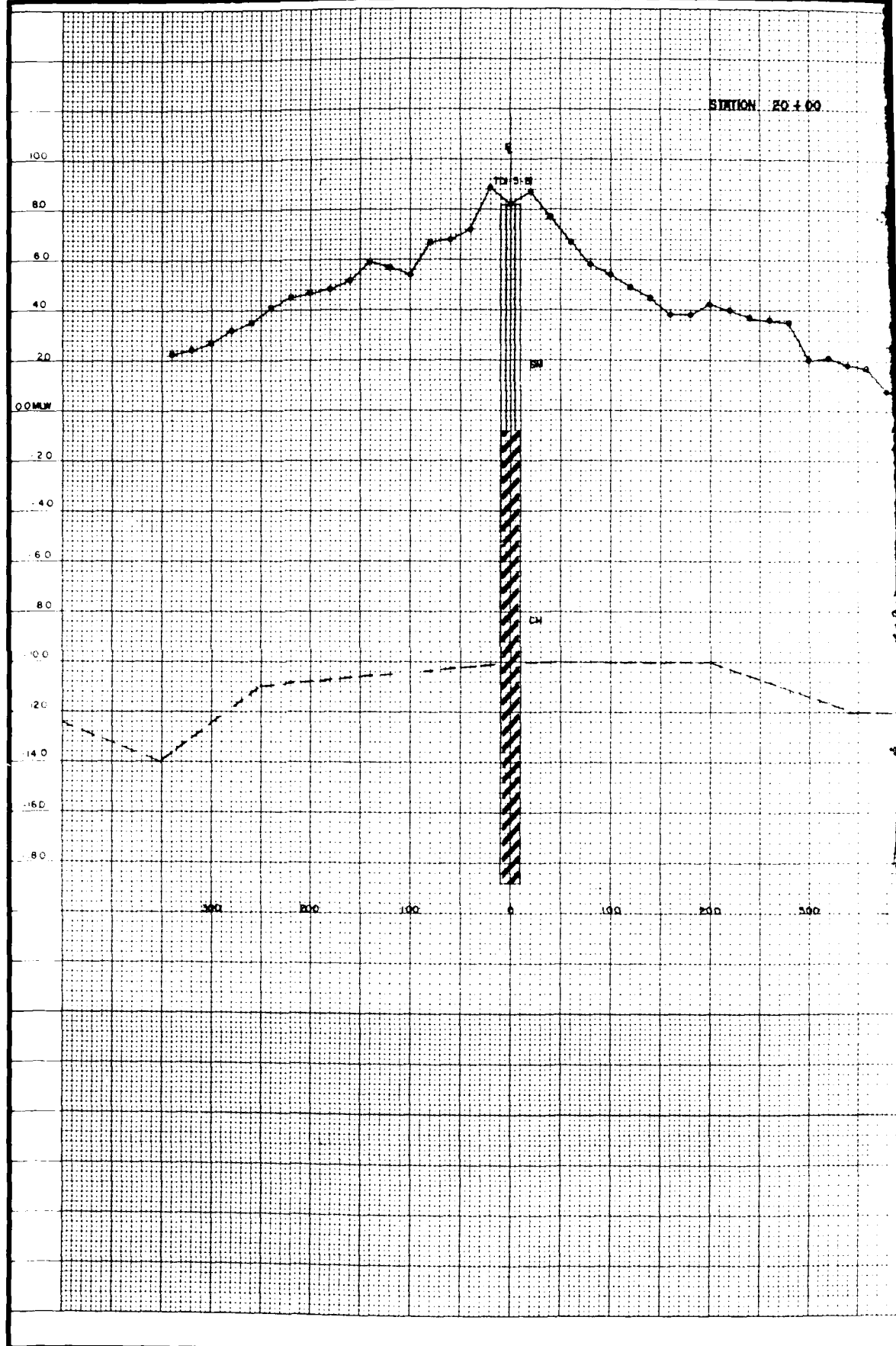
Figure 15

STATION 15 + 00



ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

Figure D5



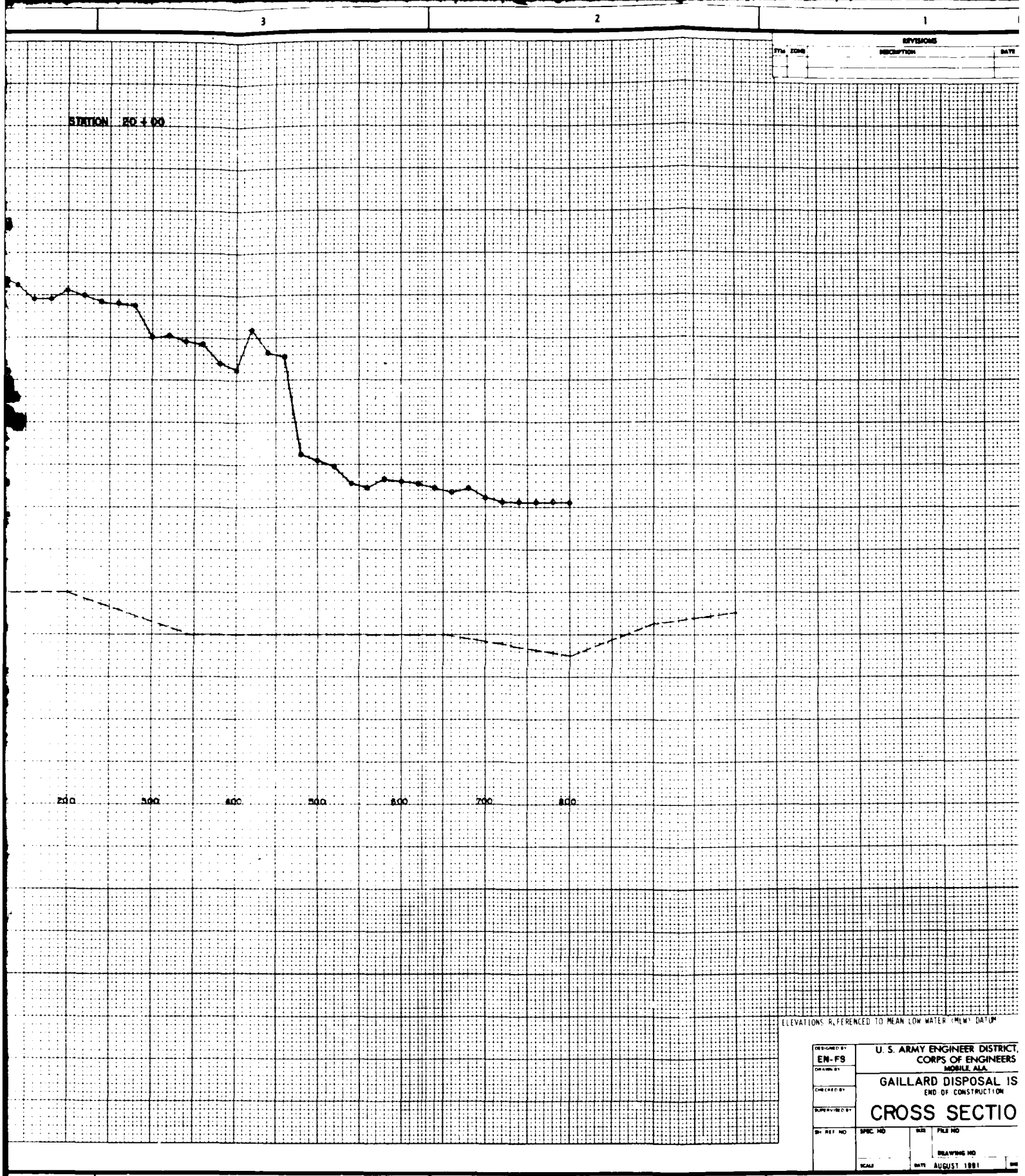
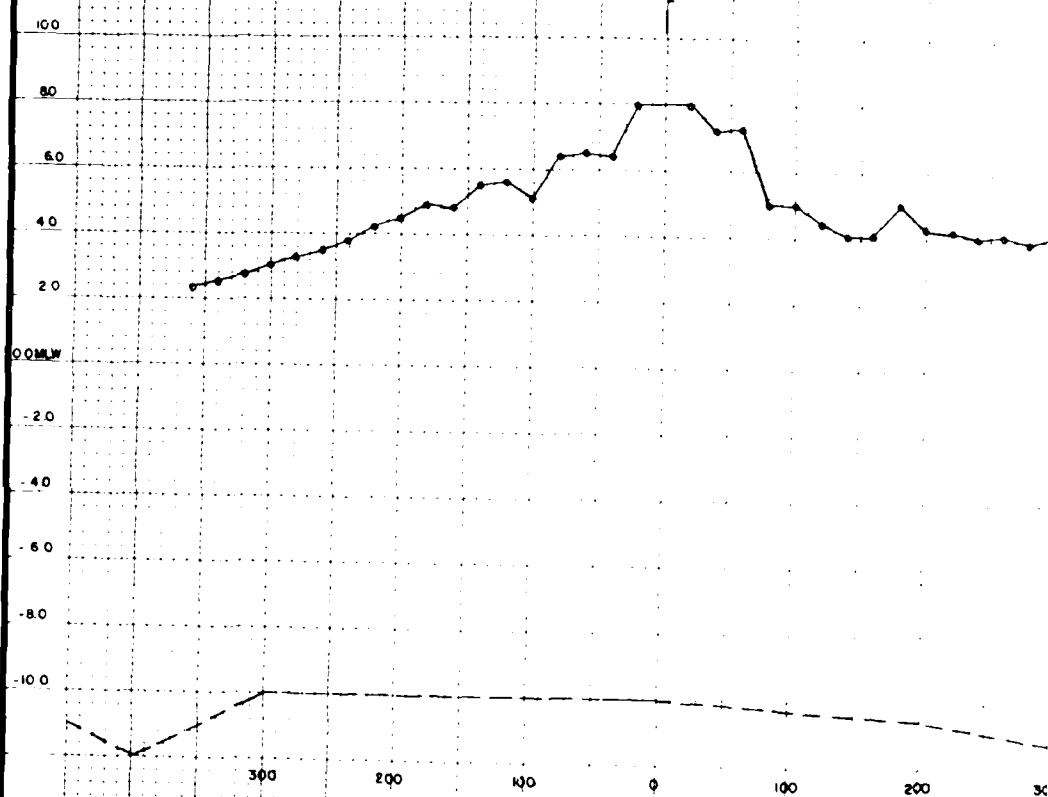


Figure D6

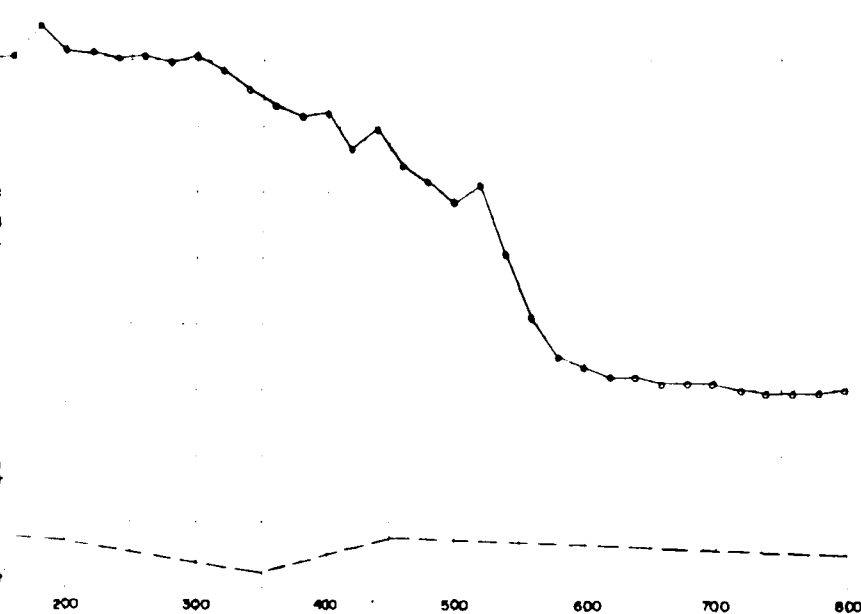
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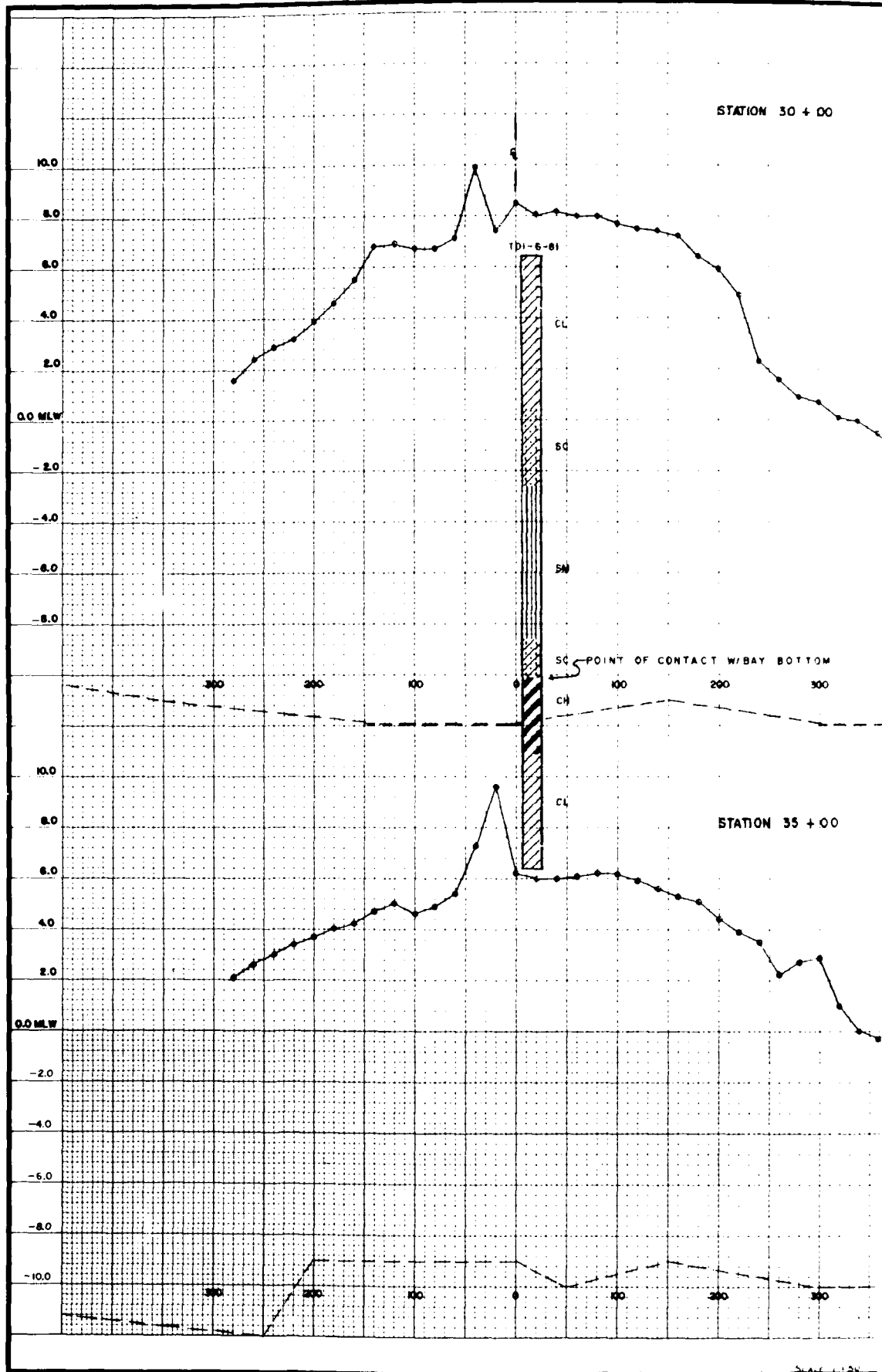


ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

SCALE 1" = 6'

DESIGNED BY EN-FS		U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA. GAILLARD DISPOSAL ISLAND END-OF-CONSTRUCTION CROSS SECTIONS	
DRAWN BY			
CHECKED BY			
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BY REF NO.	SPEC. NO.	REV.	FILE NO.
SCALE		DATE	SHEET
		AUGUST 1961	6

Figure D7



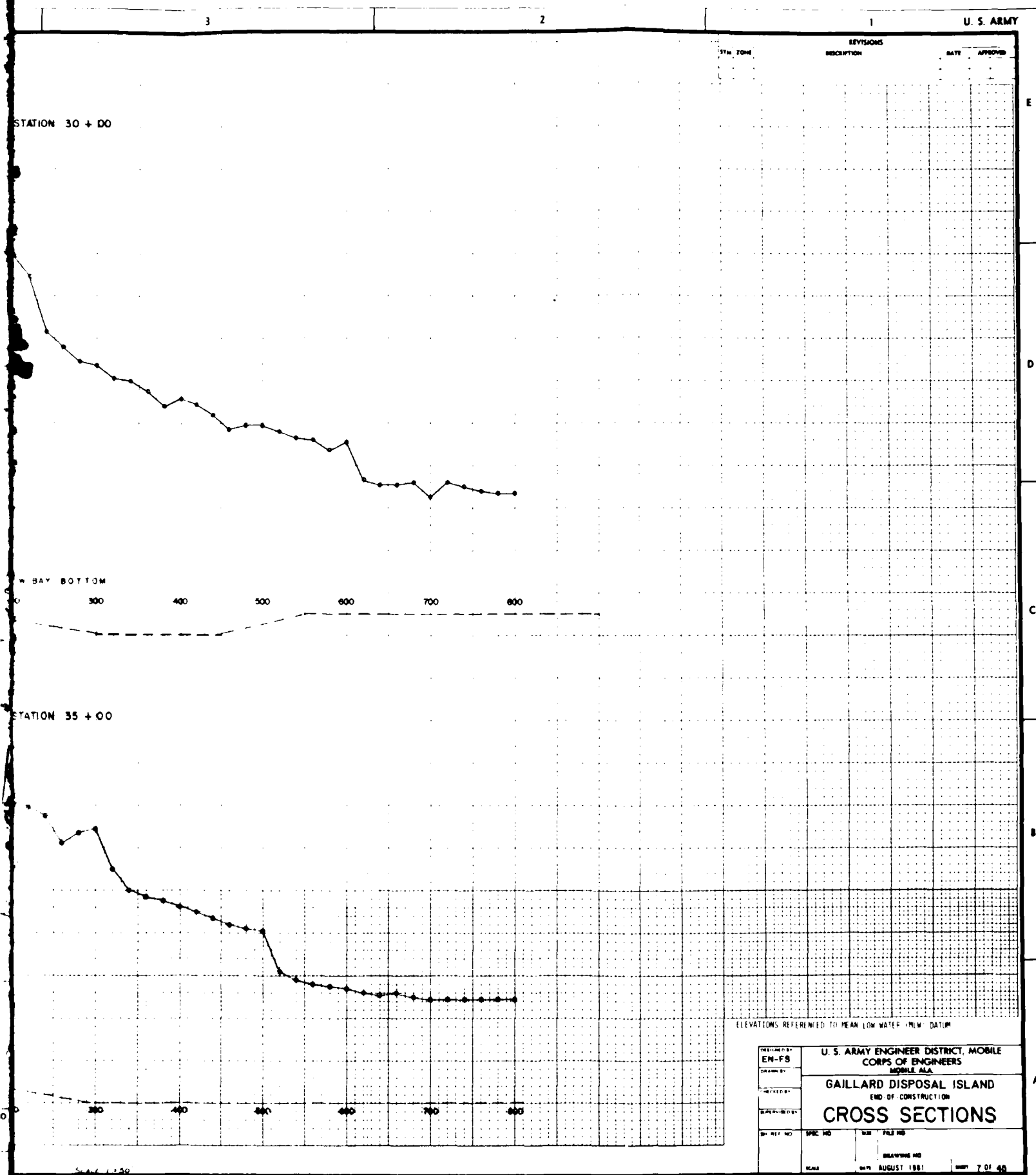
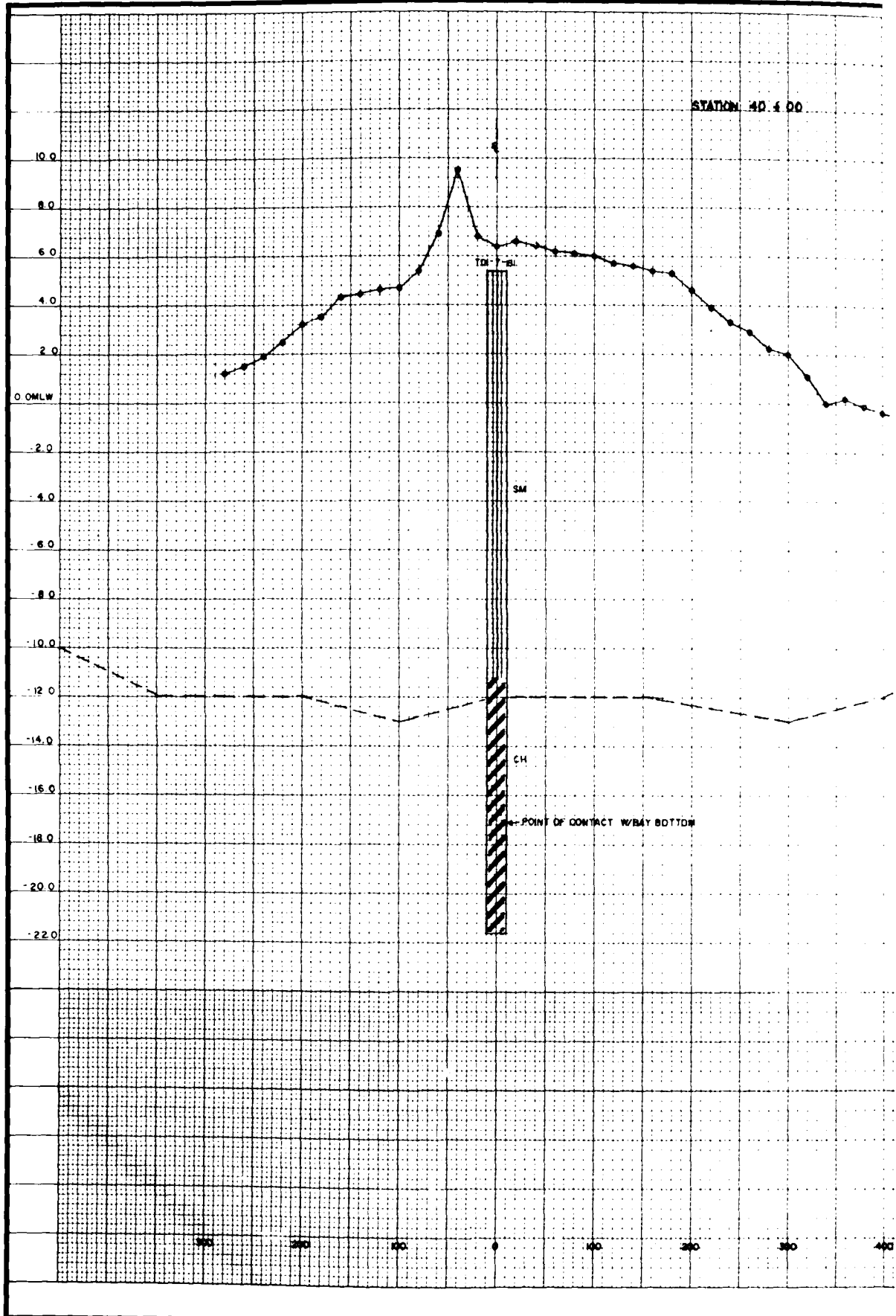


Figure D8



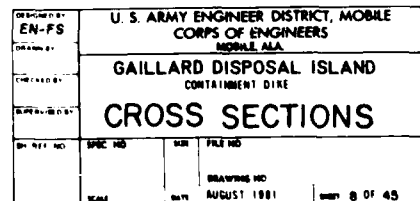
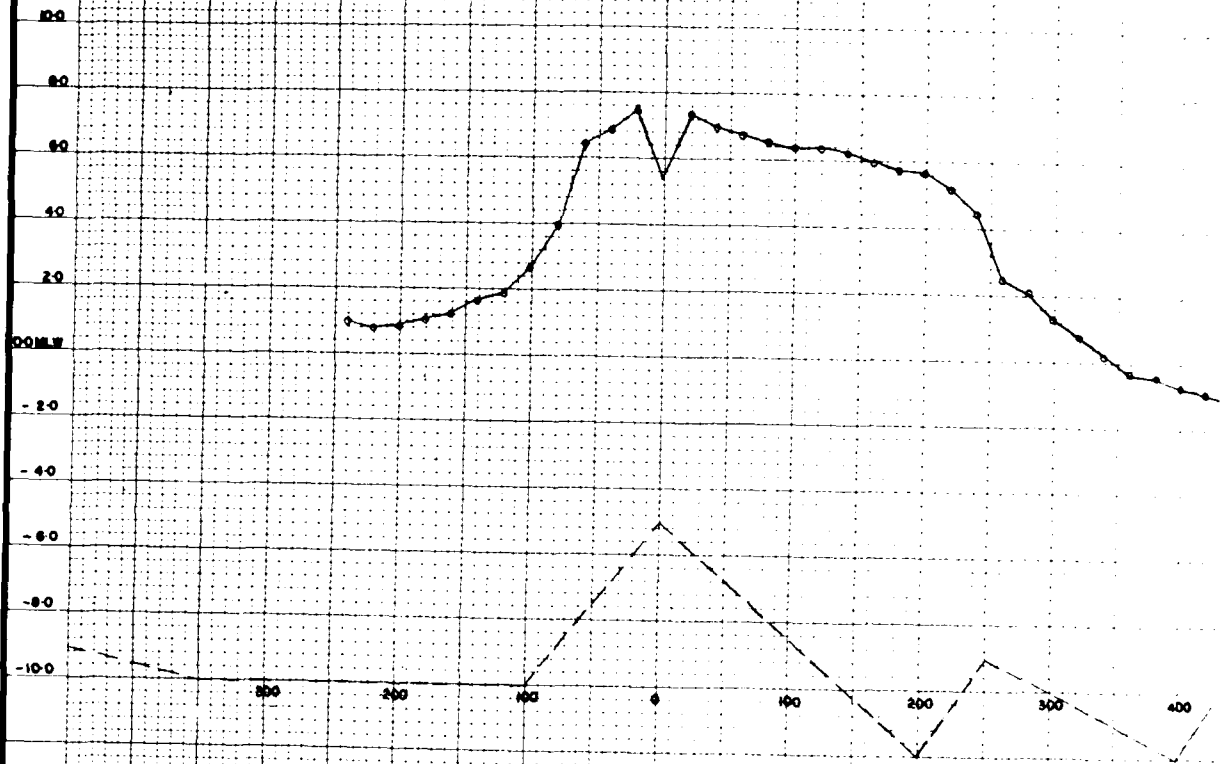


Figure D9

STATION 45 + 00



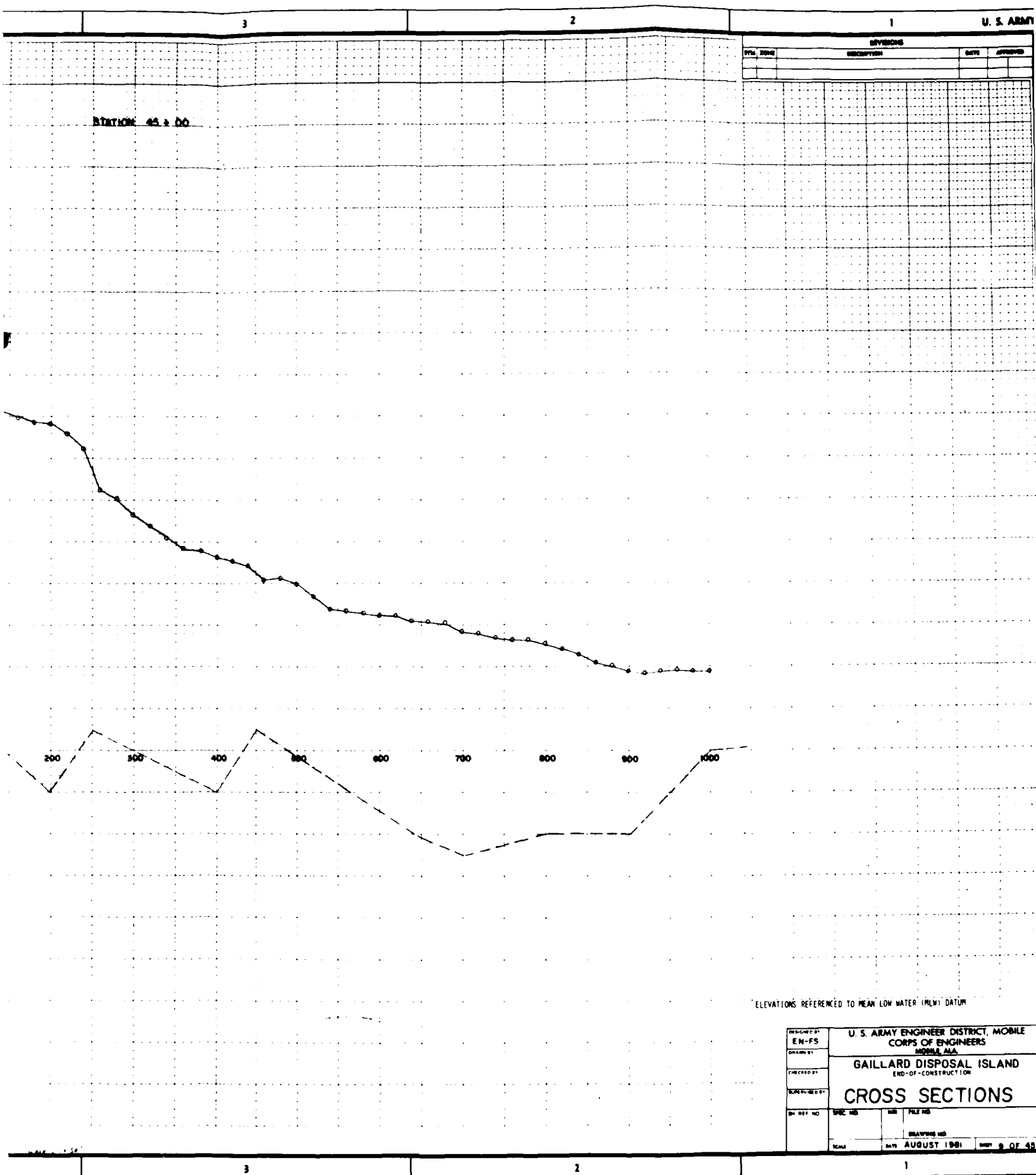


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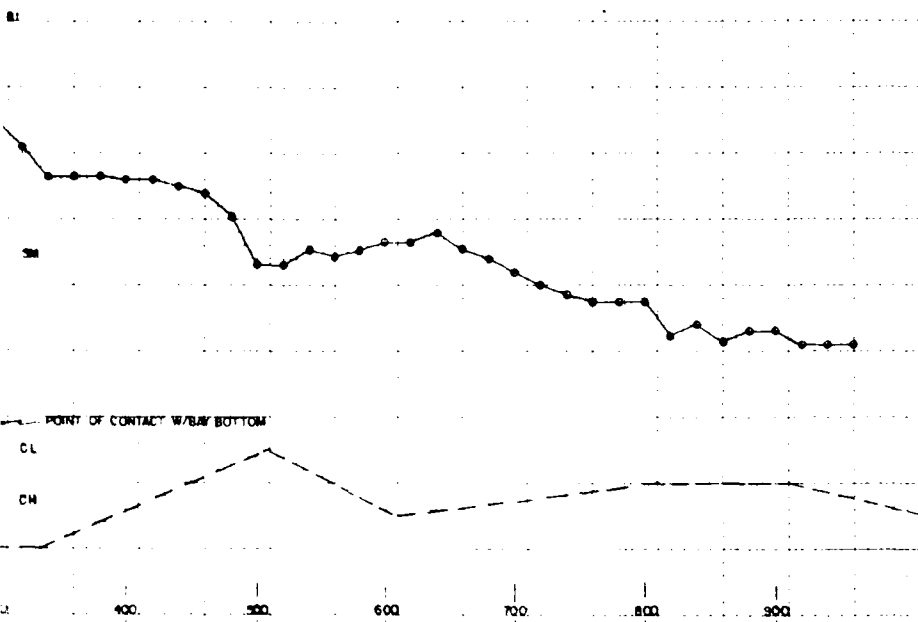
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DATE

APPROVED

STATION 50 + 00



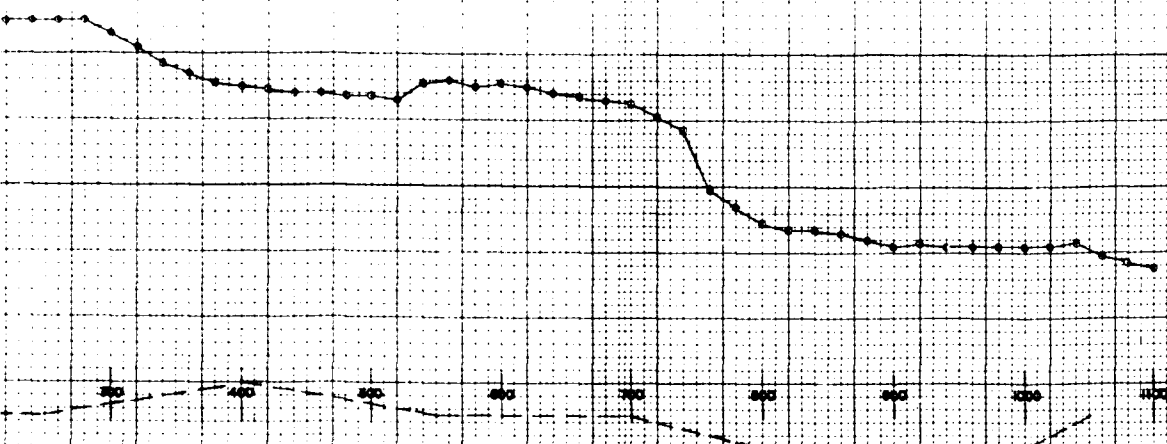
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TDL-9-BI AT STA. 50 + 08.4

TDL-10-BI AT STA. 50 + 06.28

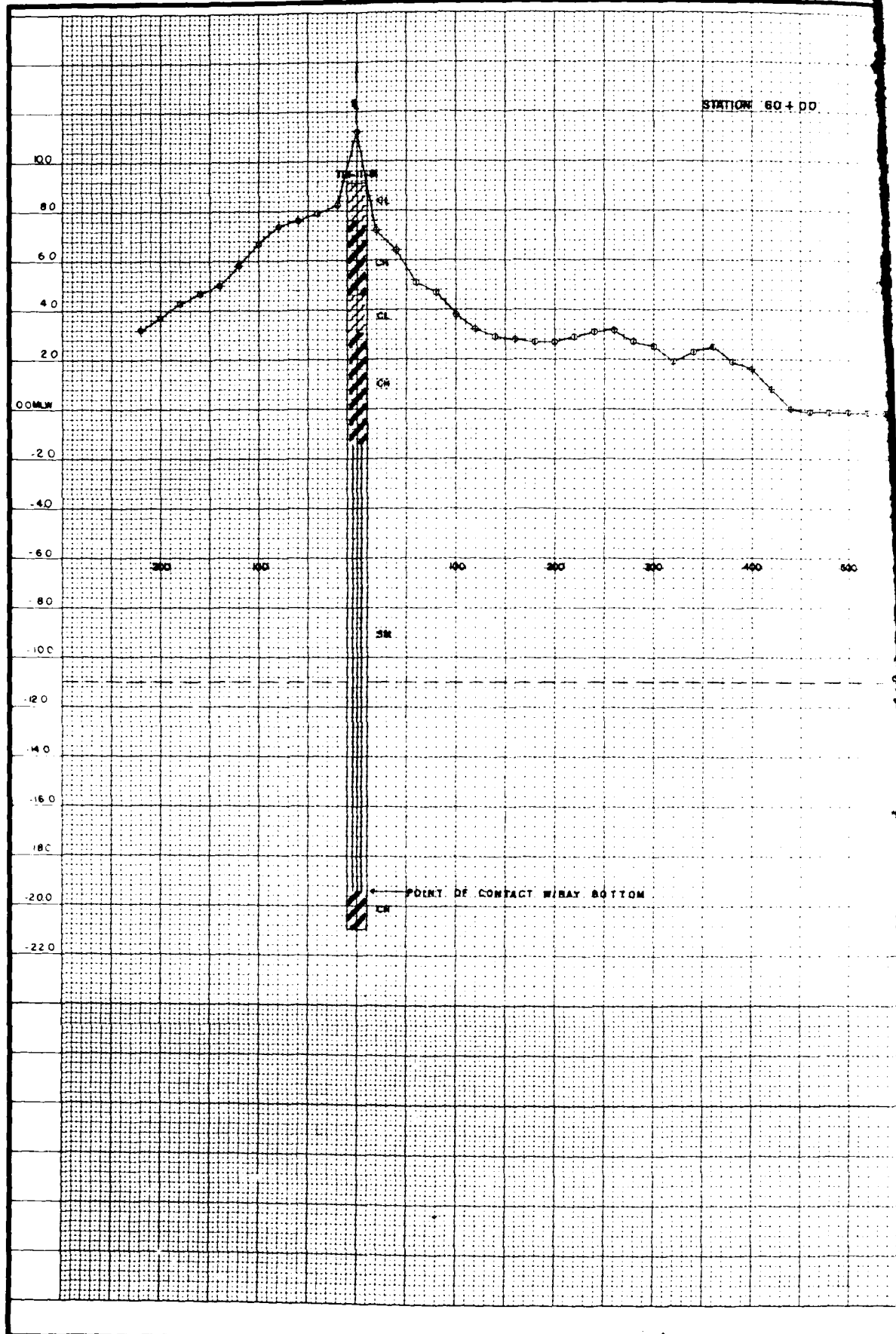
STATION 55 + 00



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BY REF. NO.	SCALE	DATE	SHEET NO. OF 45

Figure D11



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BY	DESCRIPTION		

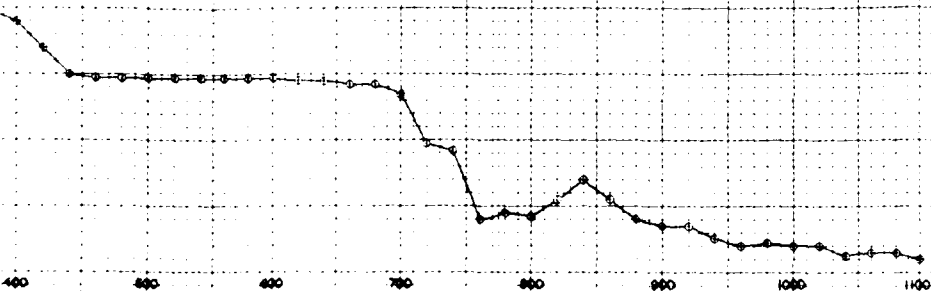
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SCALE	DATE	DRAWING NO.	
	AUGUST 1961	11 OF 45	

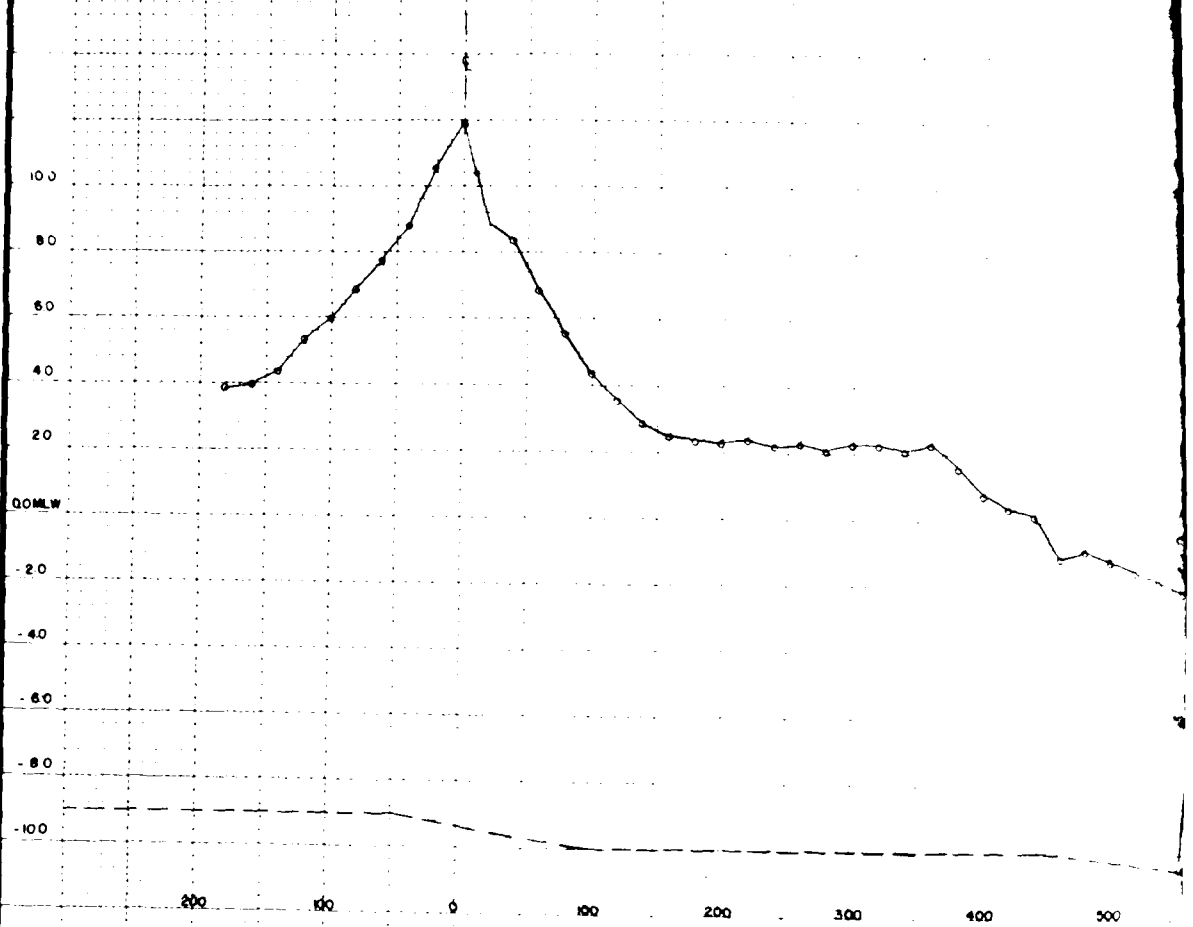
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Figure D12

STATION 65 + 00



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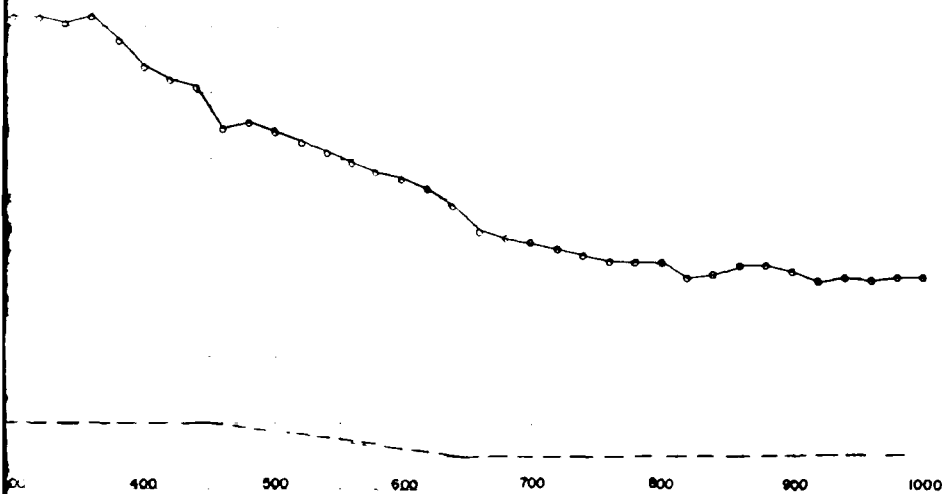
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REVISIONS			
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STATION 65 + 00



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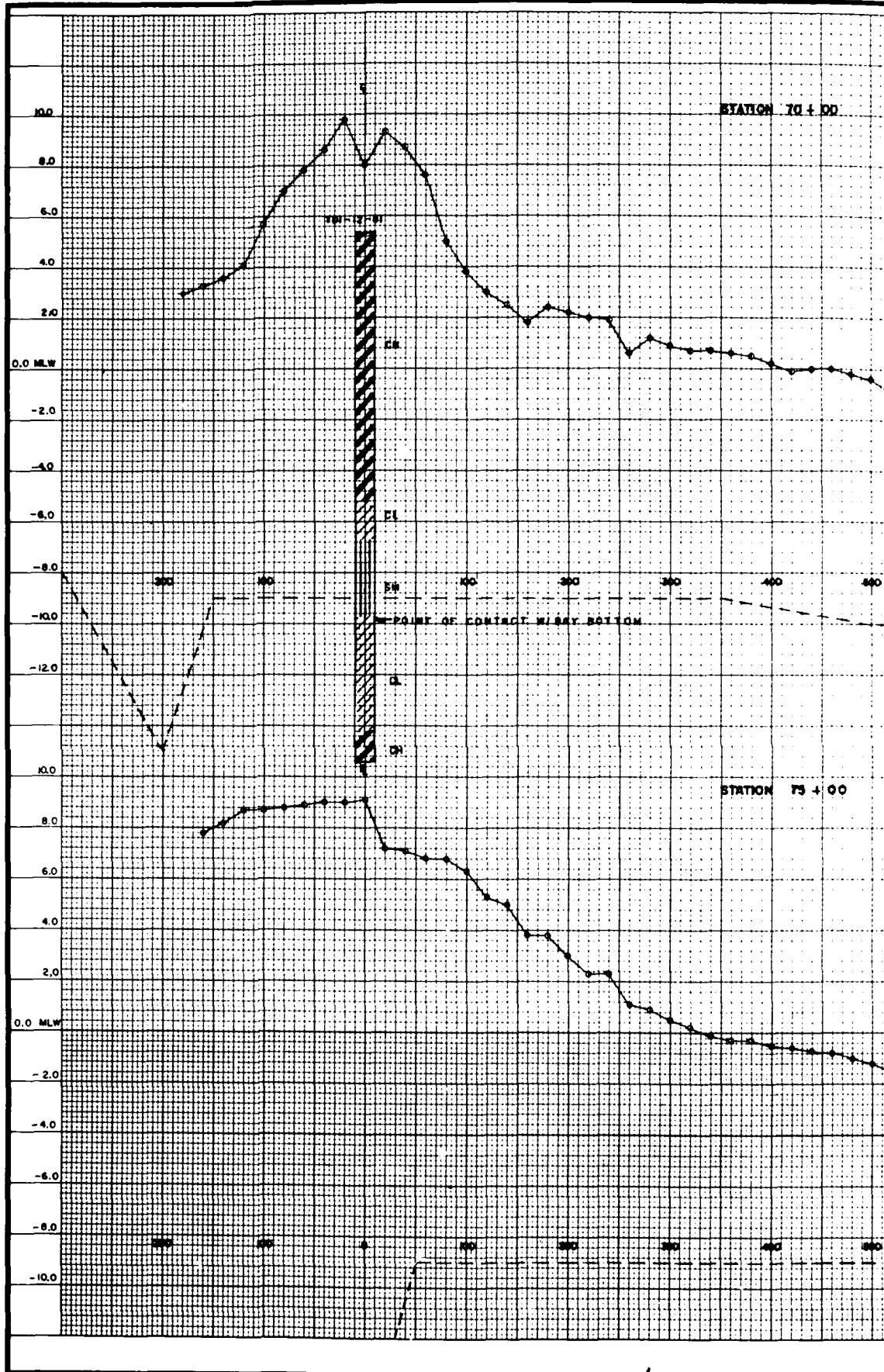
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EN - FS	CORPS OF ENGINEERS		
DRAWN BY	HARRIS, AIA		
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REVIEWED BY	END-OF-CONSTRUCTION		
BY REF. NO.	SPEC. NO.	REV.	FILE NO.
SCALE	DATE AUGUST 1961		BY

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Figure D13



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STATION 70 + 00

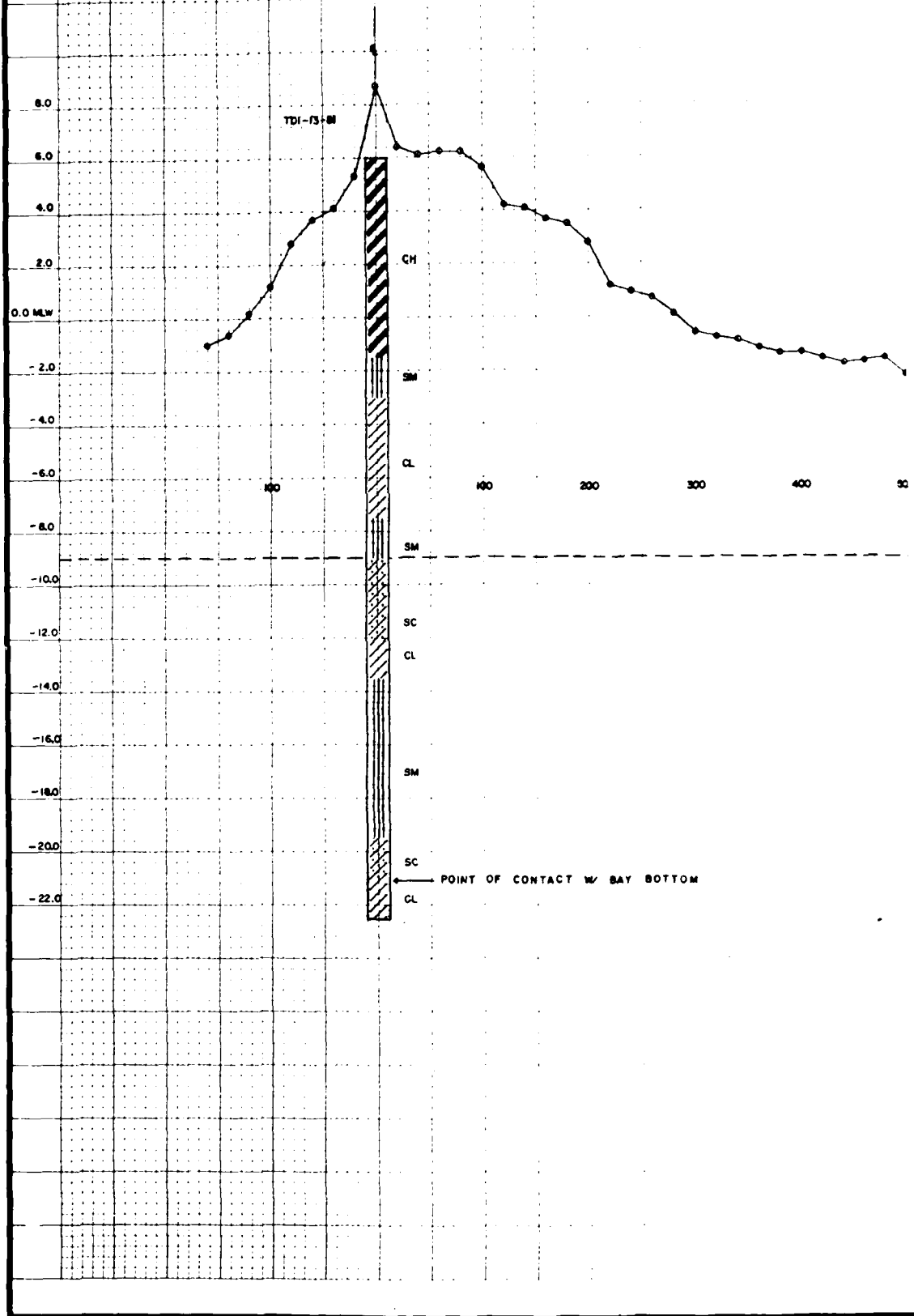
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DR. REF. NO.	SPEC. NO.	DATE	FILE NO.
SCALE	DATE	DRAWING NO.	
	AUGUST 1981		
		SHEET 13 OF 45	

Figure D14

STATION 80 + 00



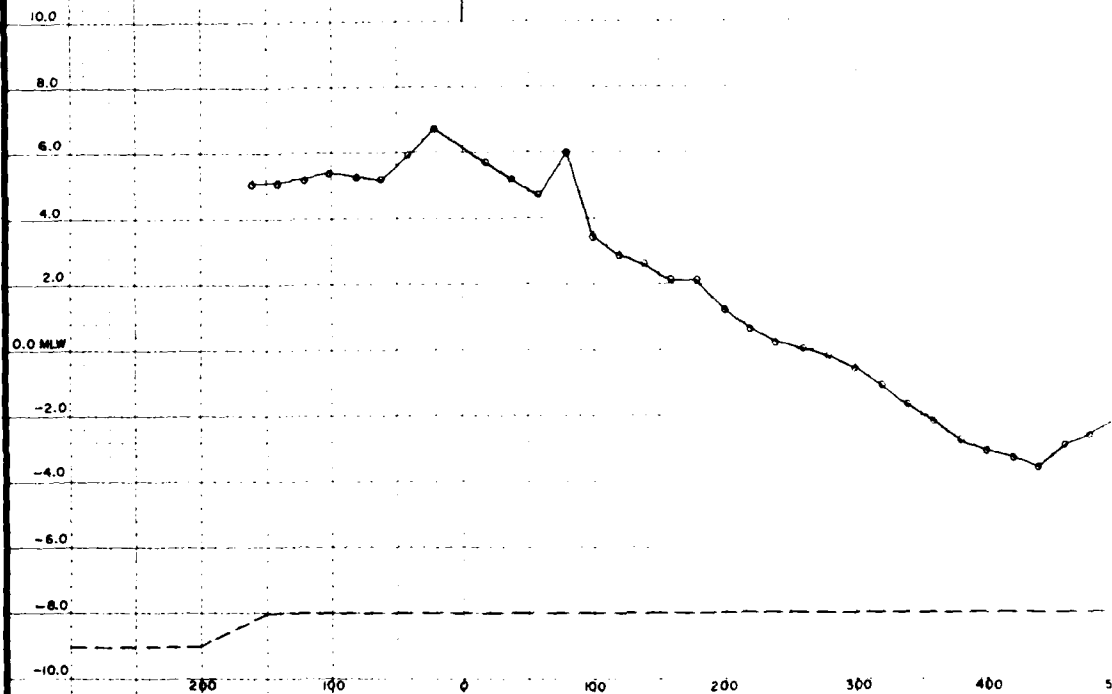
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Scale	DATE	AMOUNT 1961	DATE 14 OF 45

Figure D15

STATION 85



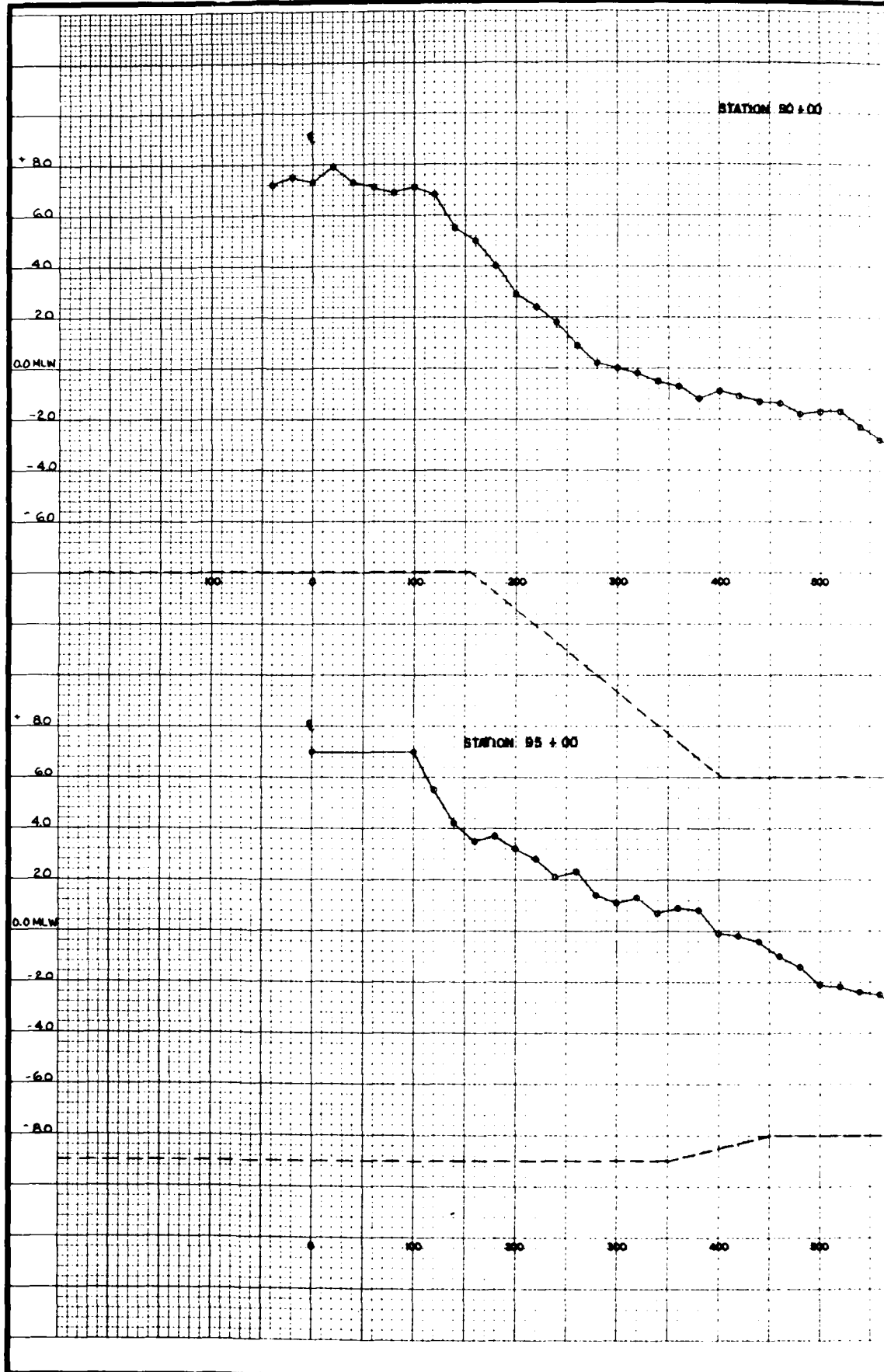
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BY REF. NO.	DRAWING NO.	DATE	SCALE
		AUGUST 1981	

Figure D16



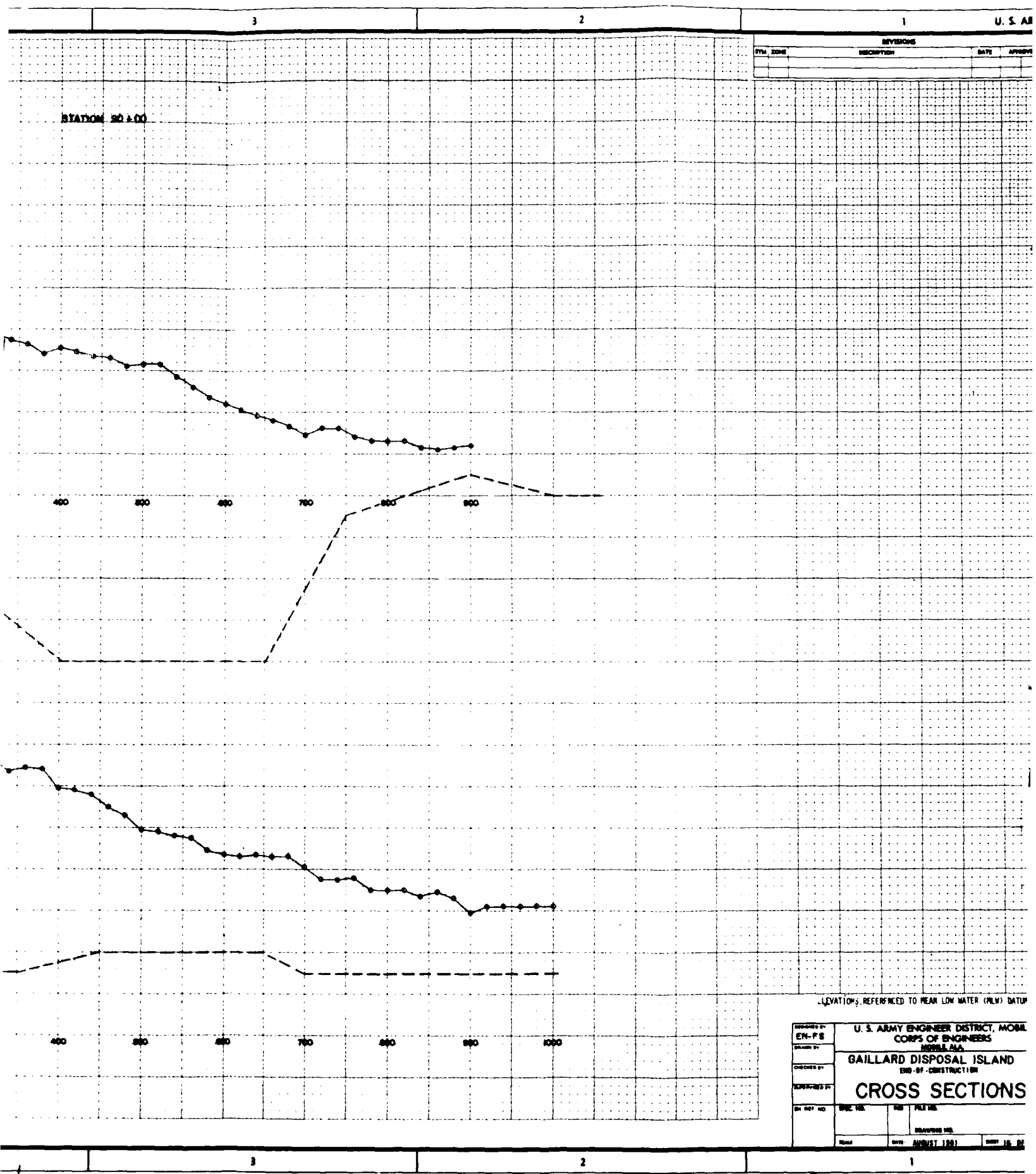
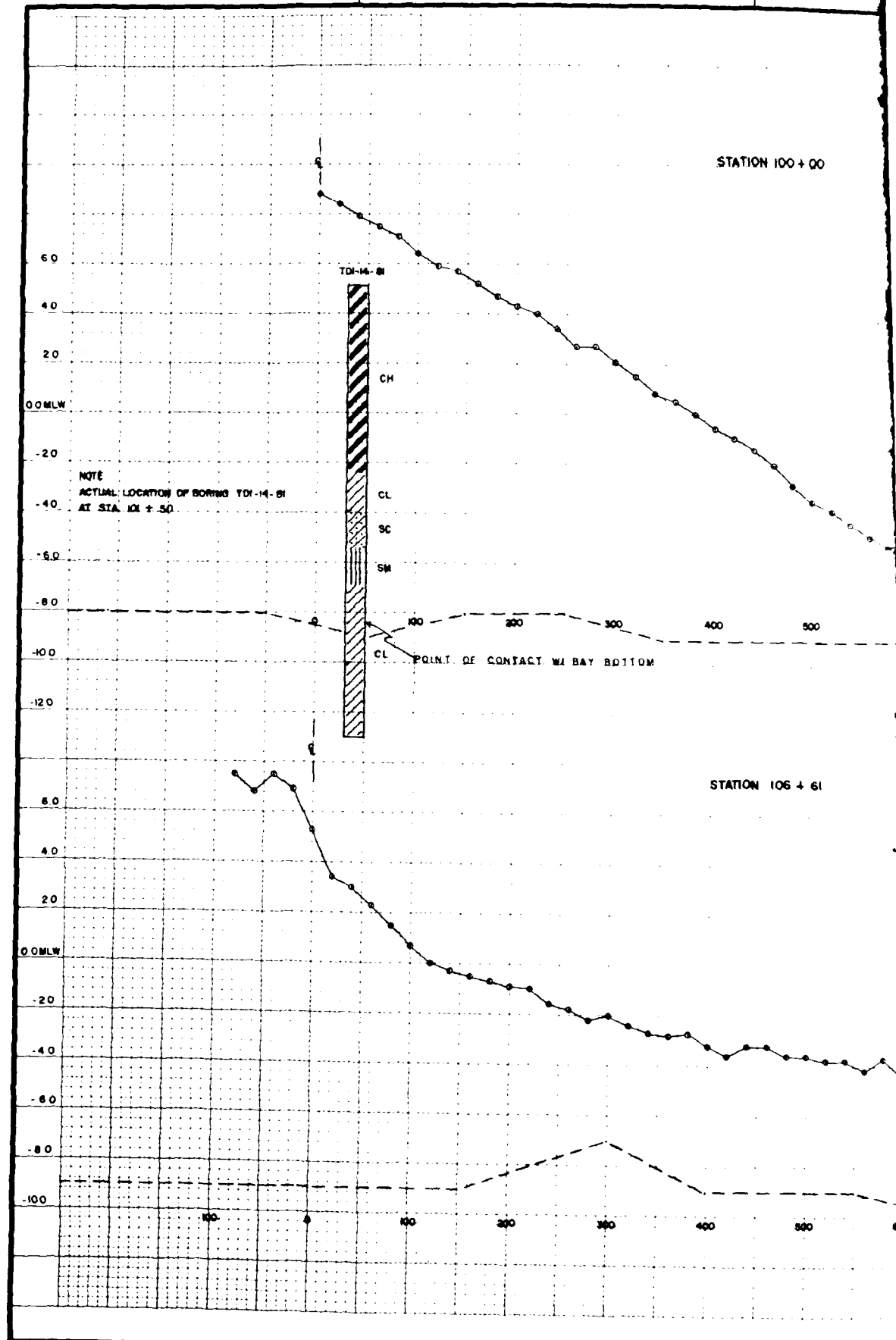
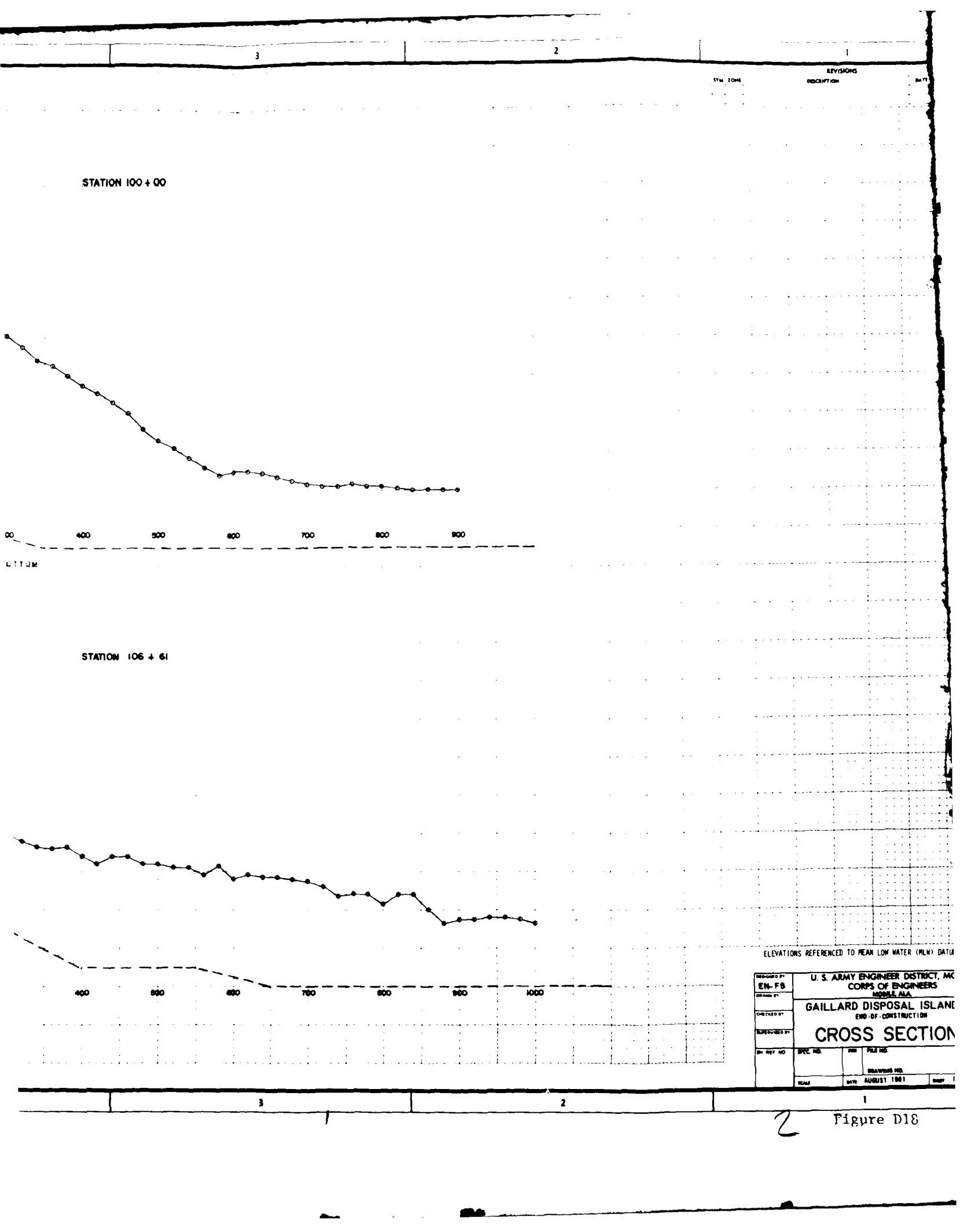
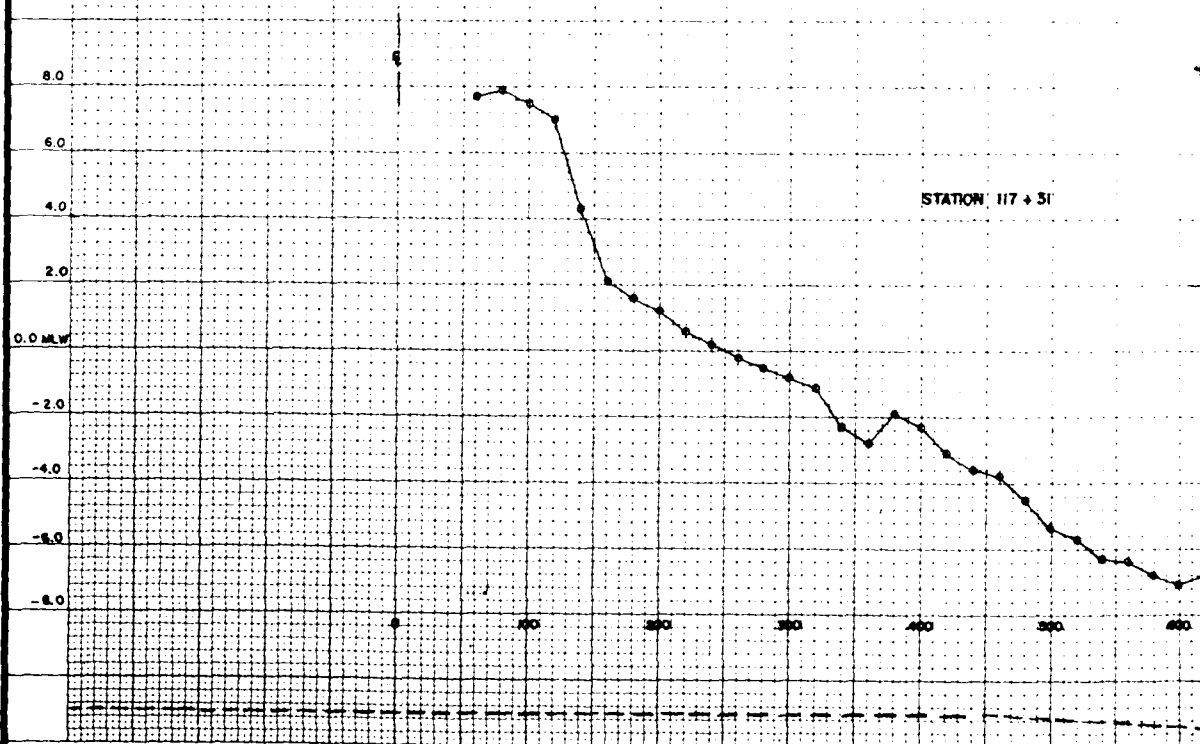
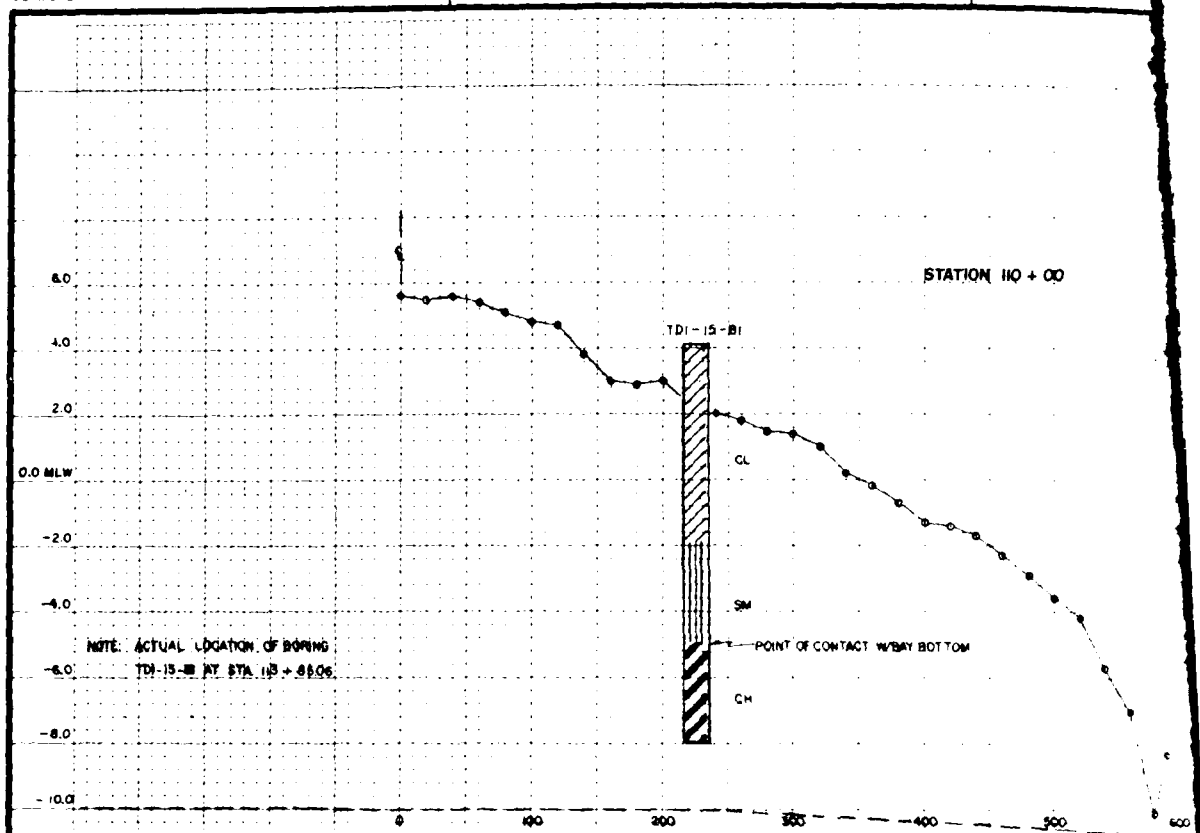


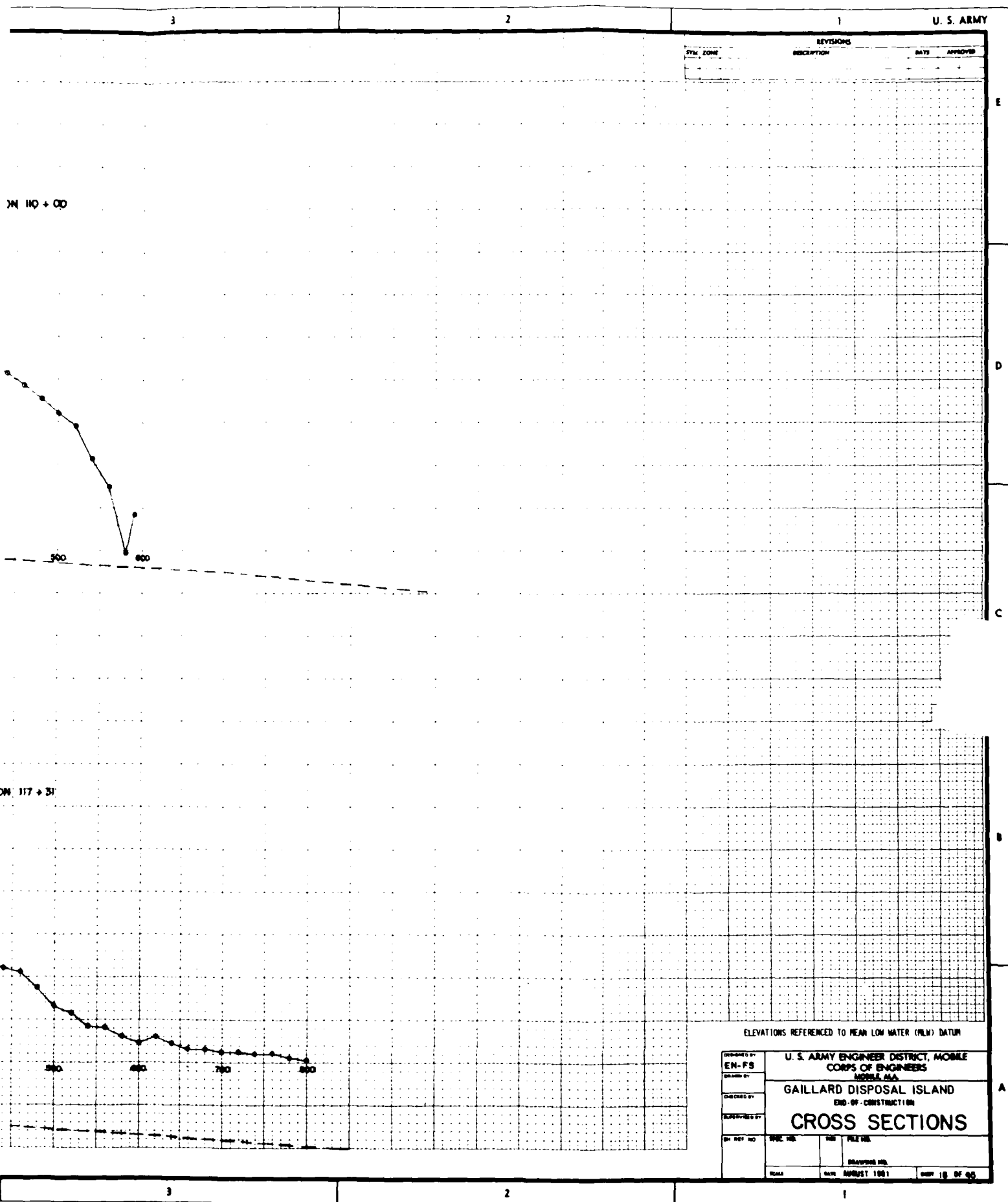
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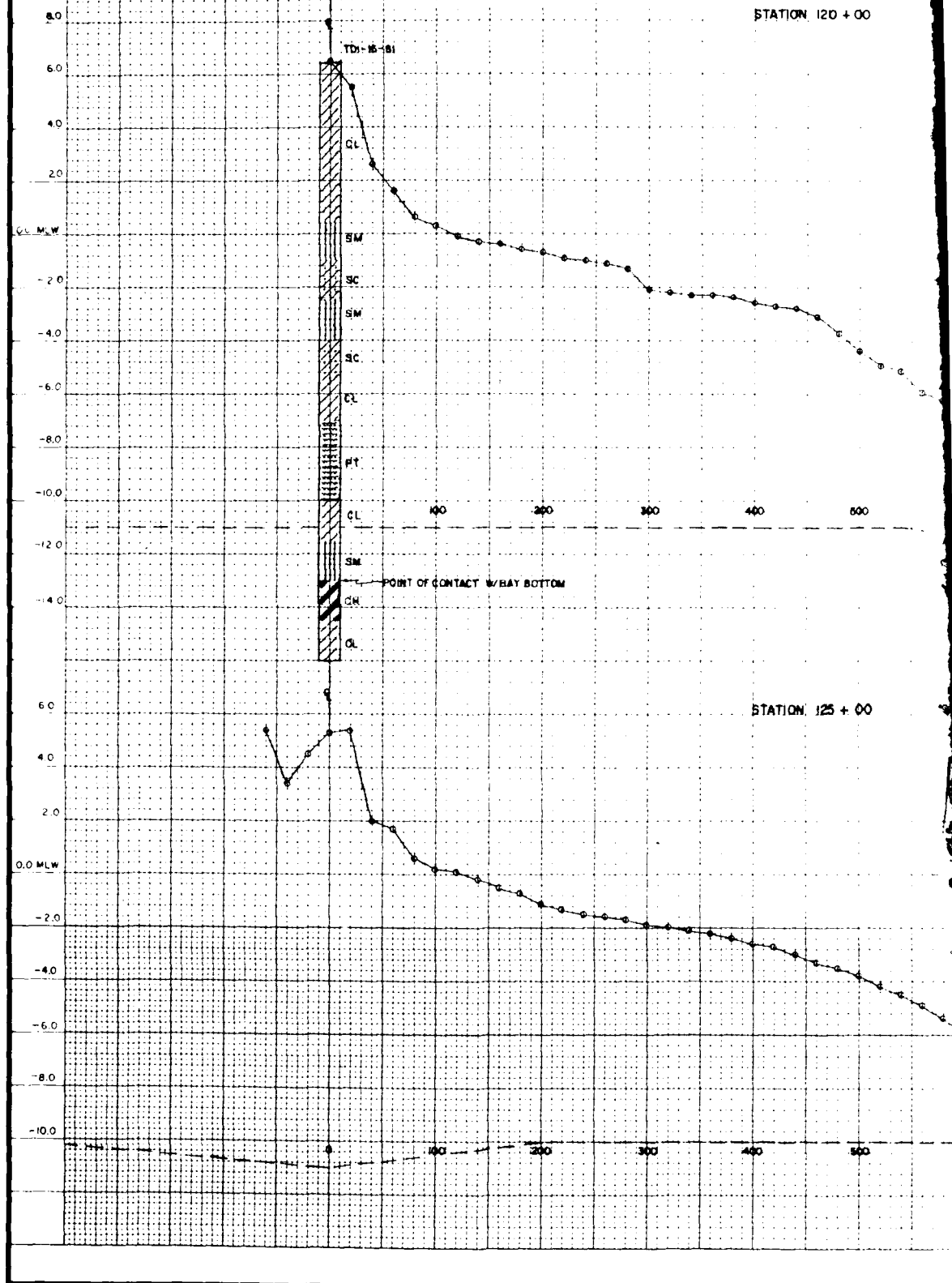


2 Figure D16





2 Figure D19



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REVISIONS

DATE APPROV

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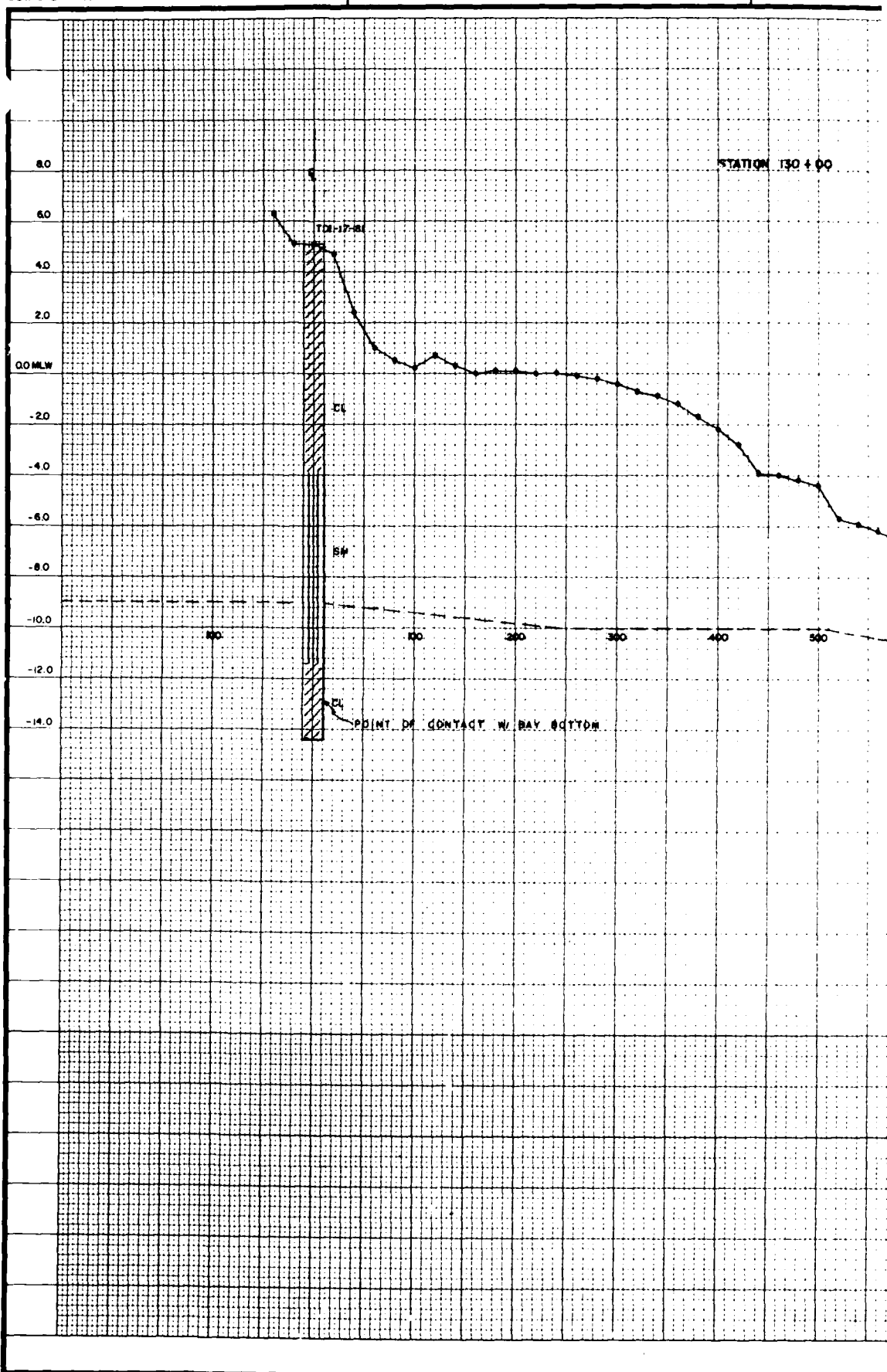
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ELEVATIONS REFERENCED TO MEAN LOW WATER - M.L.W. T.

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SUPERVISED BY	SPEC. NO.	SHEET	FILE NO.
BY REF. NO.	DRAWING NO.		
SCALE	DATE	AUGUST 1981	SHEET 19 OF

Figure D20



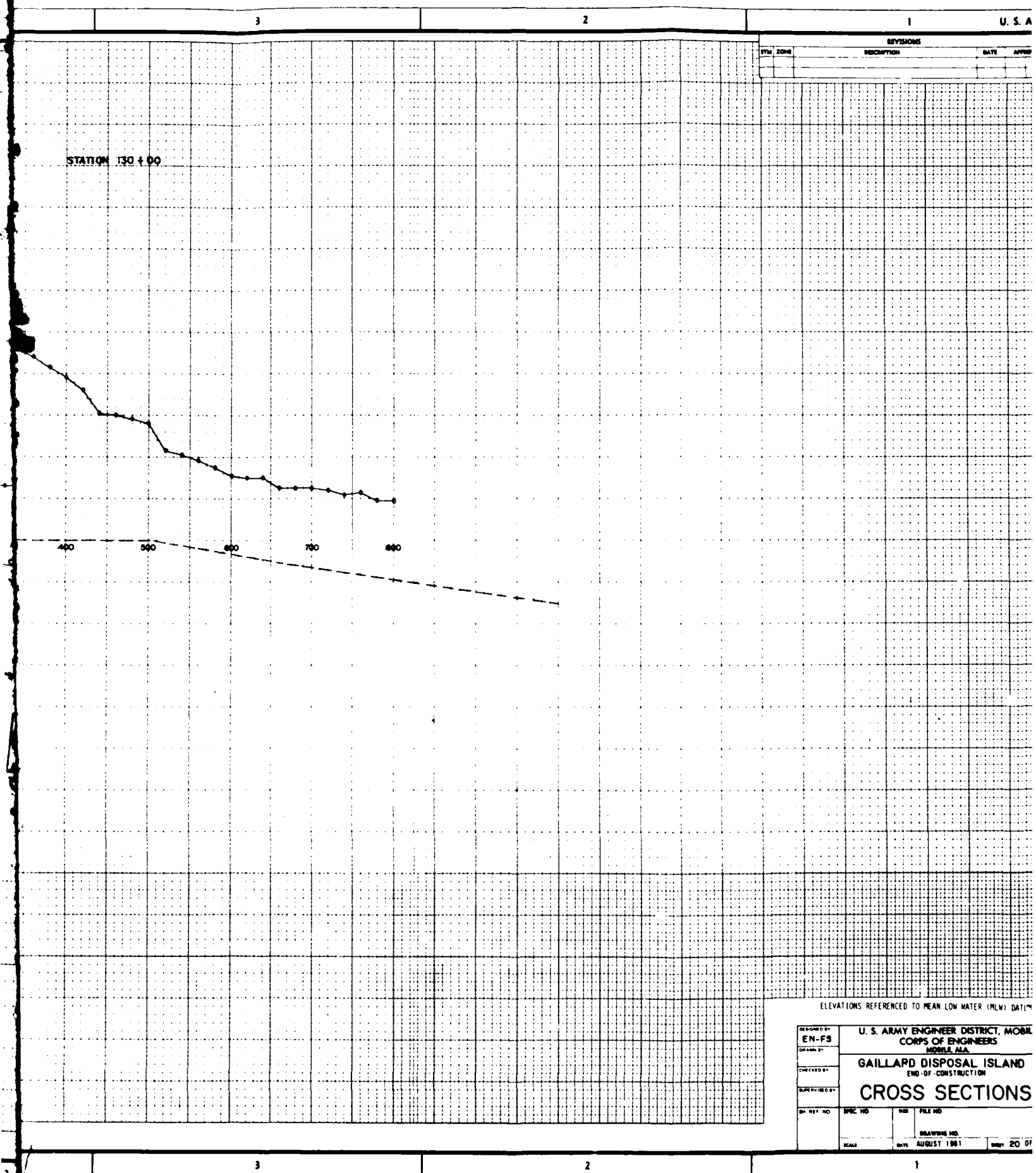
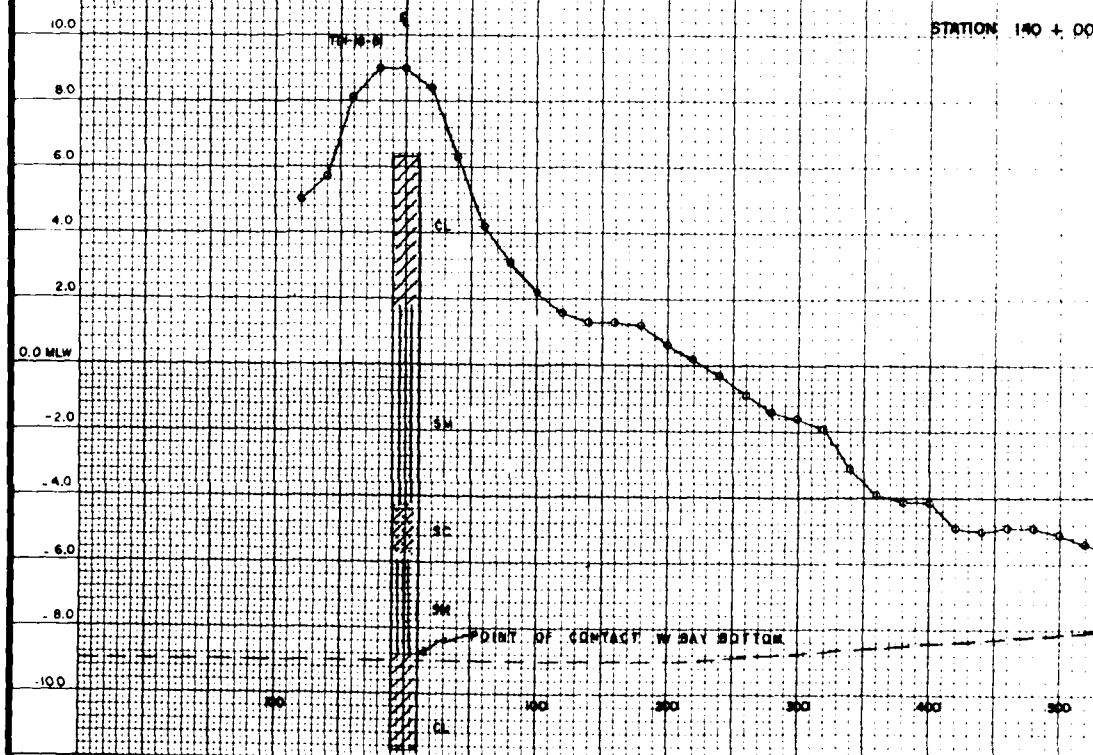
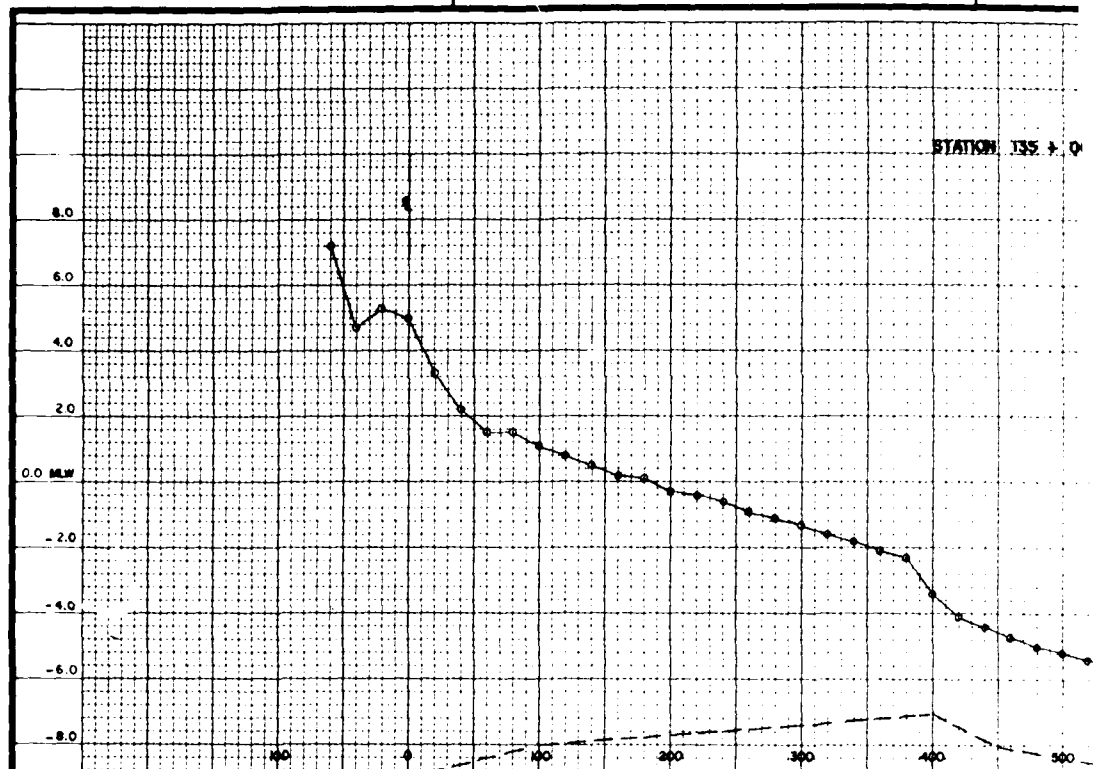


Figure D21

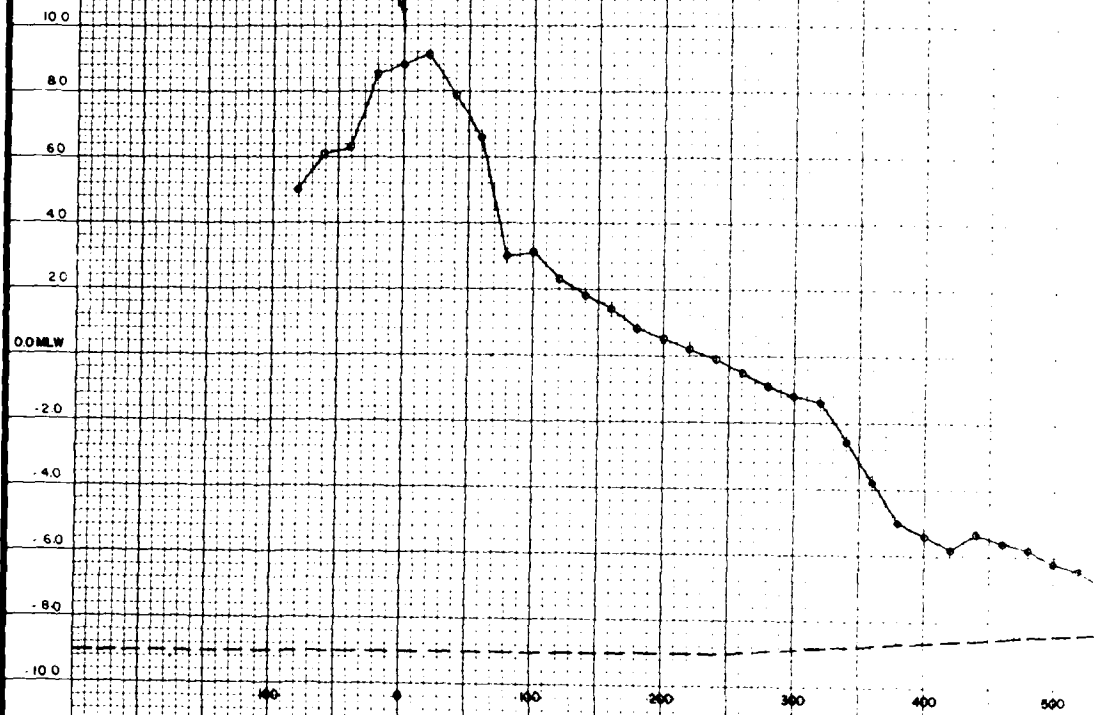


STATION 140 + 00

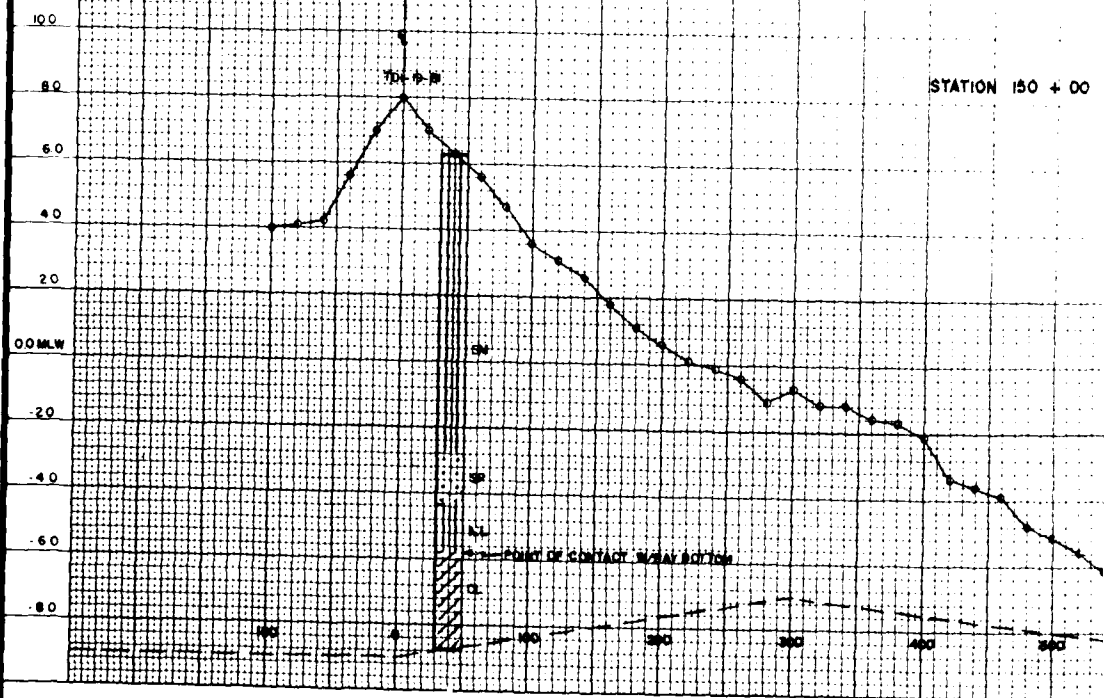
ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

Figure 022

STATION 145 + 00



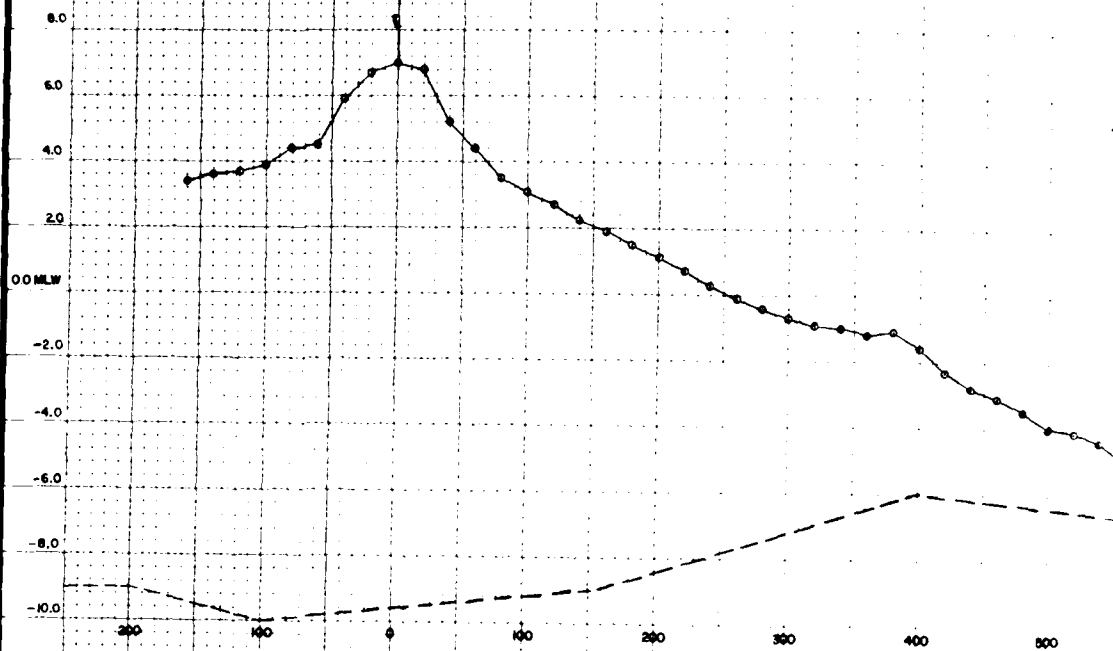
STATION 150 + 00



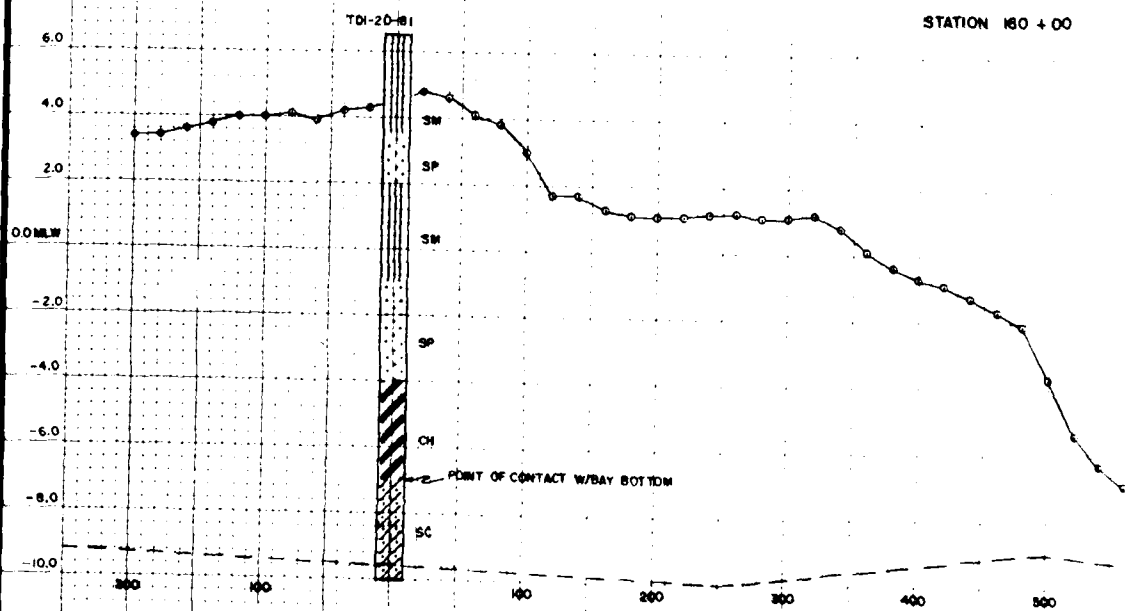
ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY EN-F8	U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.		
DRAWN BY	GAILLARD DISPOSAL ISLAND END OF CONSTRUCTION		
CHECKED BY			
SUPERVISED BY	CROSS SECTIONS		
BY REF NO.	SPEC. NO.	SIZE	FILE NO.
SCALE	DRAWINGS NO.		
	DATE	AUGUST 1981	SHEET 22 OF 46

STATION 155 + 00



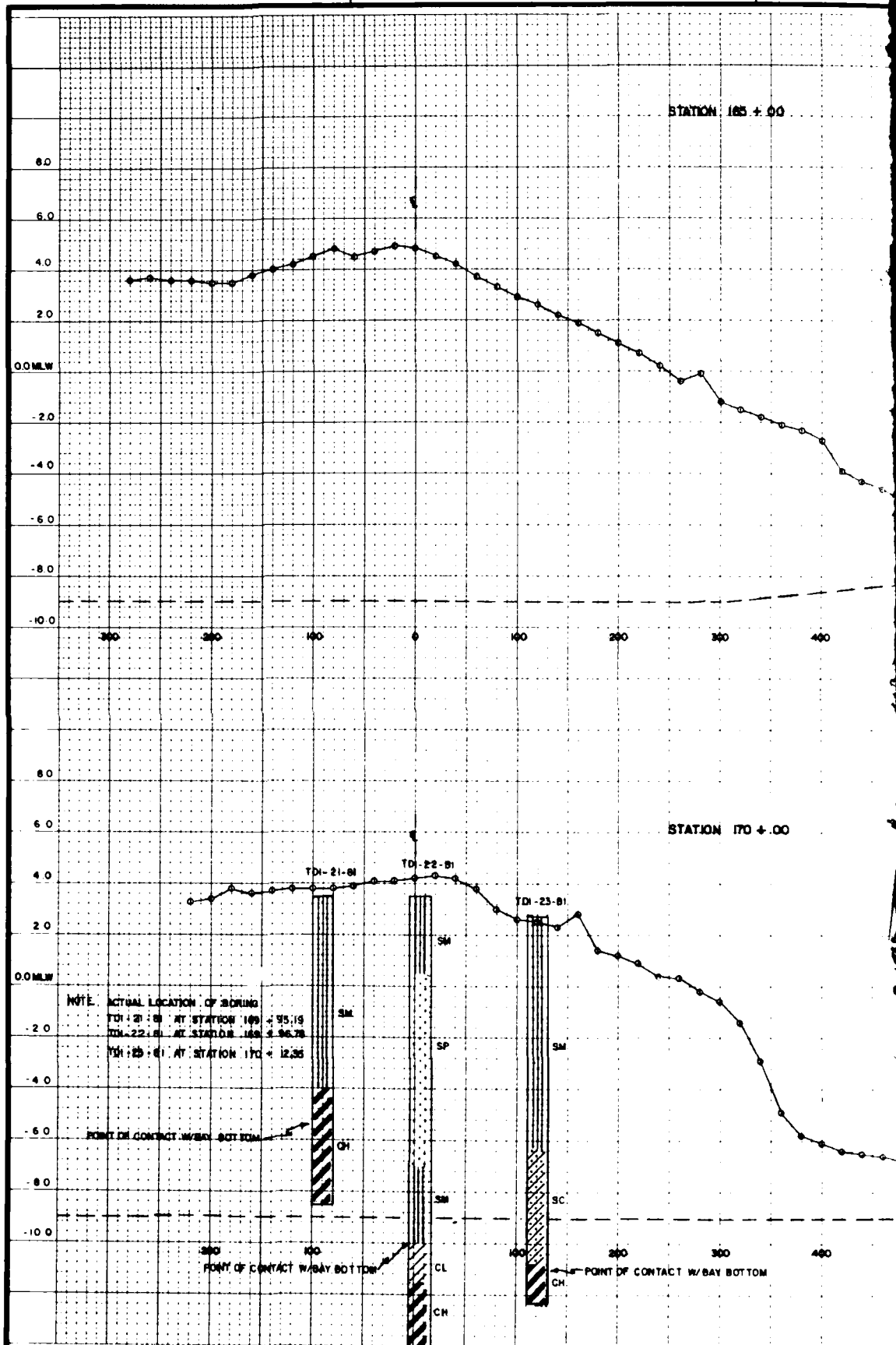
STATION 160 + 00



Concentration (g/l)	Optical Density
0	1.0
100	0.9
200	0.8
300	0.7
400	0.6
500	0.4
600	0.25
700	0.25
800	0.25

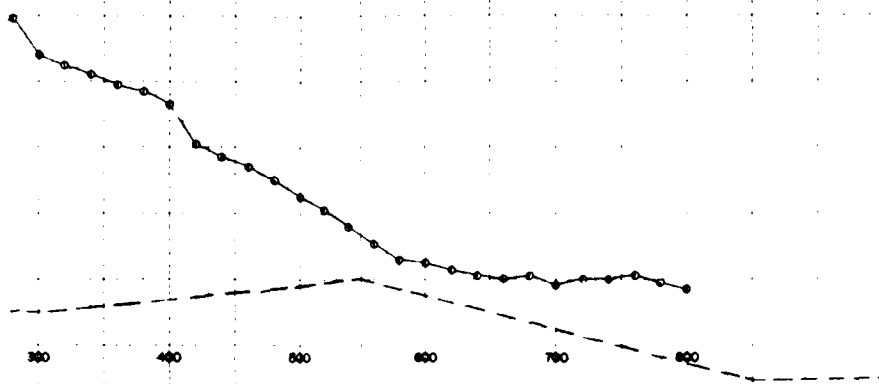
DESIGNED BY EN-FB	U. S. ARMY ENGINEER DISTRICT, MOBILE		
DRAWING BY	CORPS OF ENGINEERS		
CHECKED BY	MOBILE ALA.		
DATE BY DESIGNED	GAILLARD DISPOSAL ISLAND		
	END OF CONSTRUCTION		
	CROSS SECTIONS		
DR. REF. NO.	SPEC. NO.	DATE	FILE NO.
	DRAWINGS NO.		
SCALE	DATE	AUGUST 1961	
		SHEET 23 OF	

Figure D24

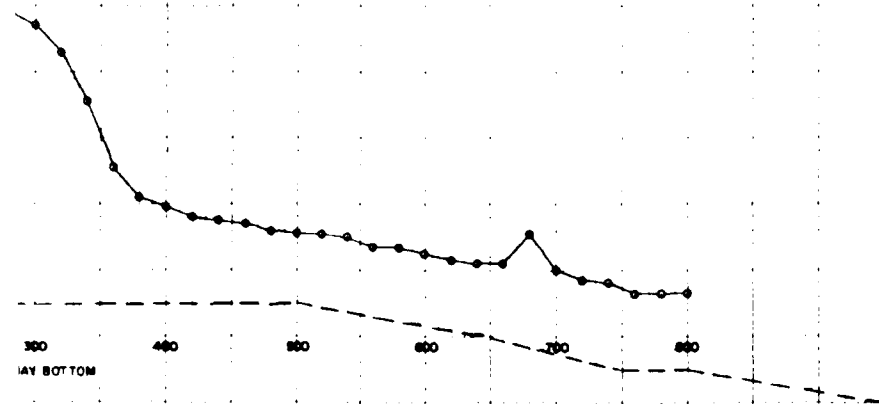


REVISIONS			
SYN. NO.	DESCRIPTION	DATE	APPROVED

NON. 165 ± 60



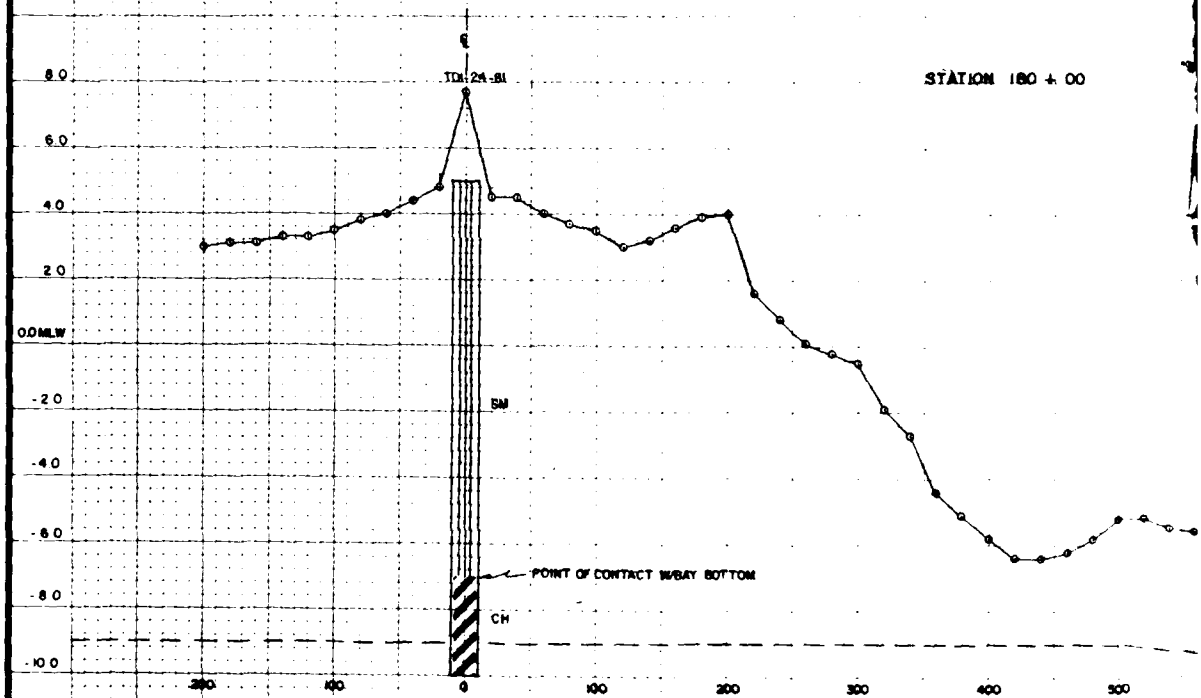
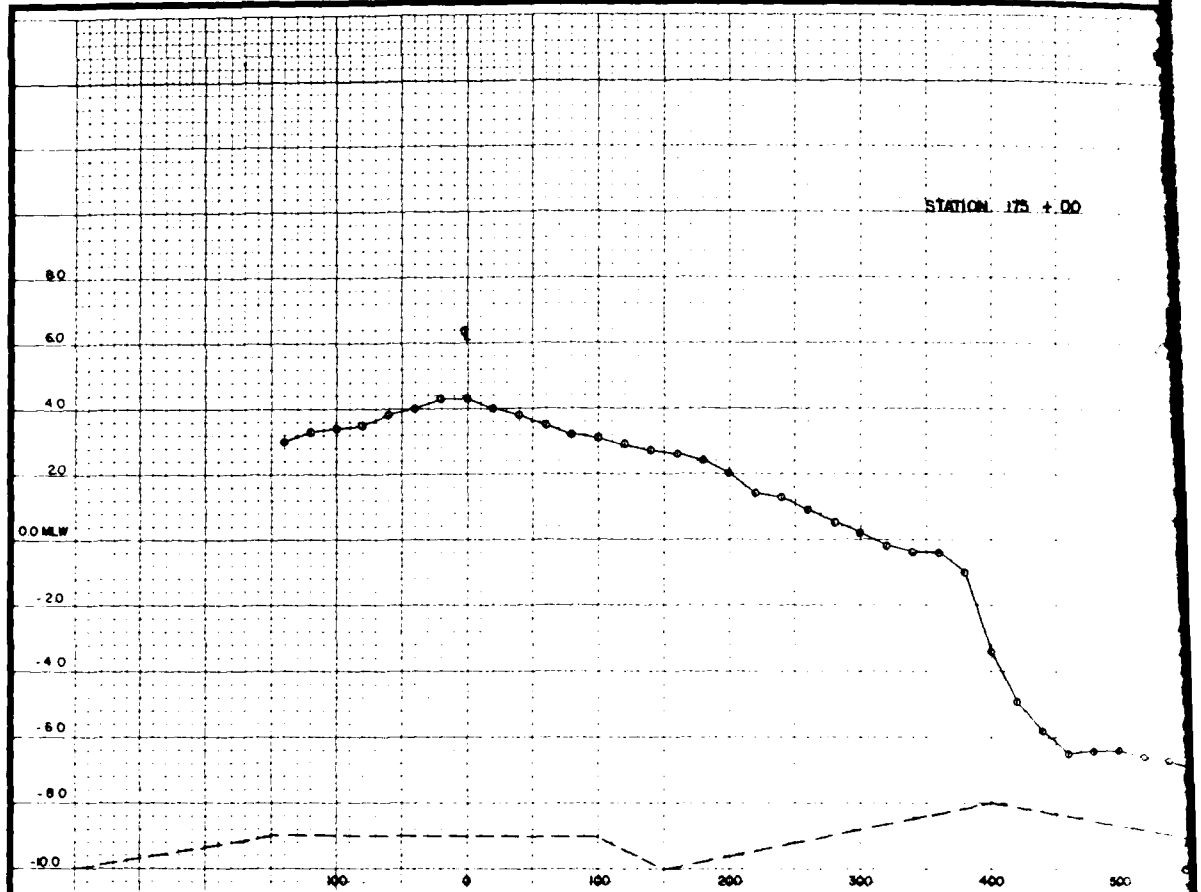
10N 170 +.00



ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY EN-FS	U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.		
DRAWN BY	GAILLARD DISPOSAL ISLAND END OF CONSTRUCTION		
CHECKED BY			
SCALE	CROSS SECTIONS		
DATE	SCALE	SHEET	TOTAL SHEETS
10/1/60	1" = 100'	1	1

Figure D25



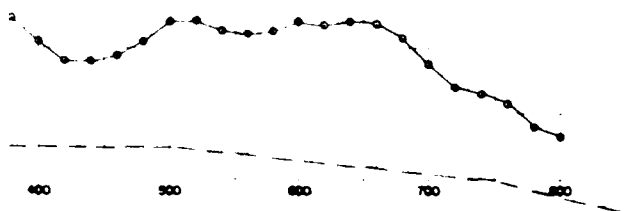
REVISIONS			
SYM	ZONE	DESCRIPTION	DATE APPROVED

1104. 175 + .00



400 800 800 700 800

Y 100 120 + 00



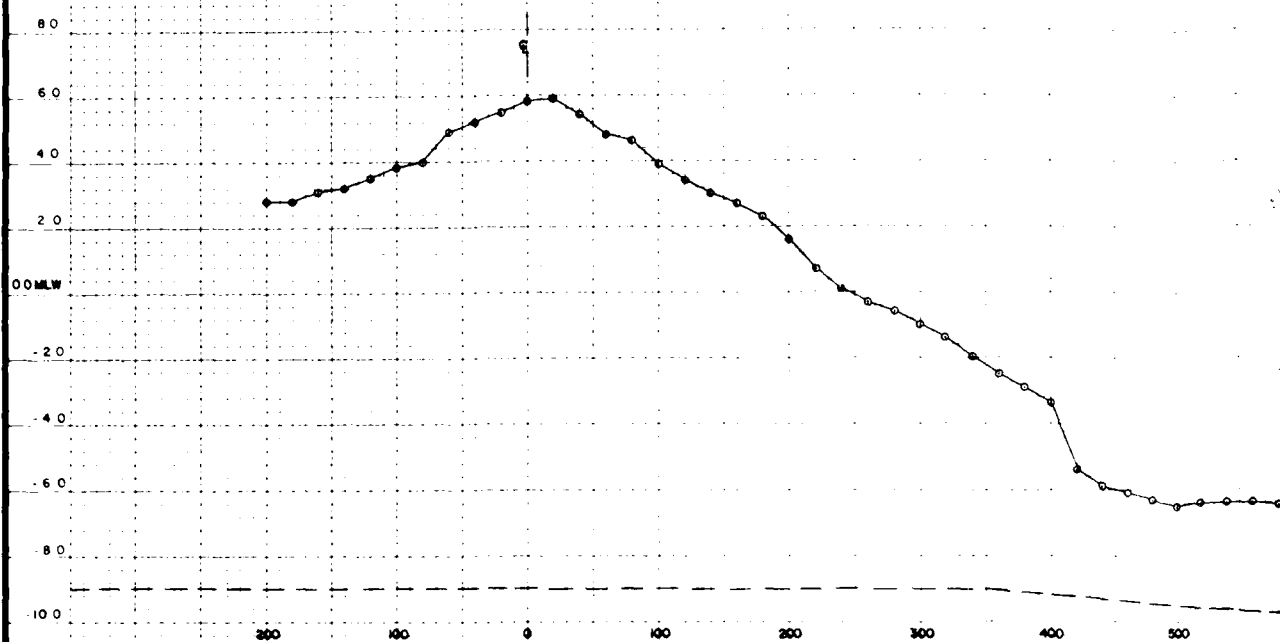
400 500 600 700 800

ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

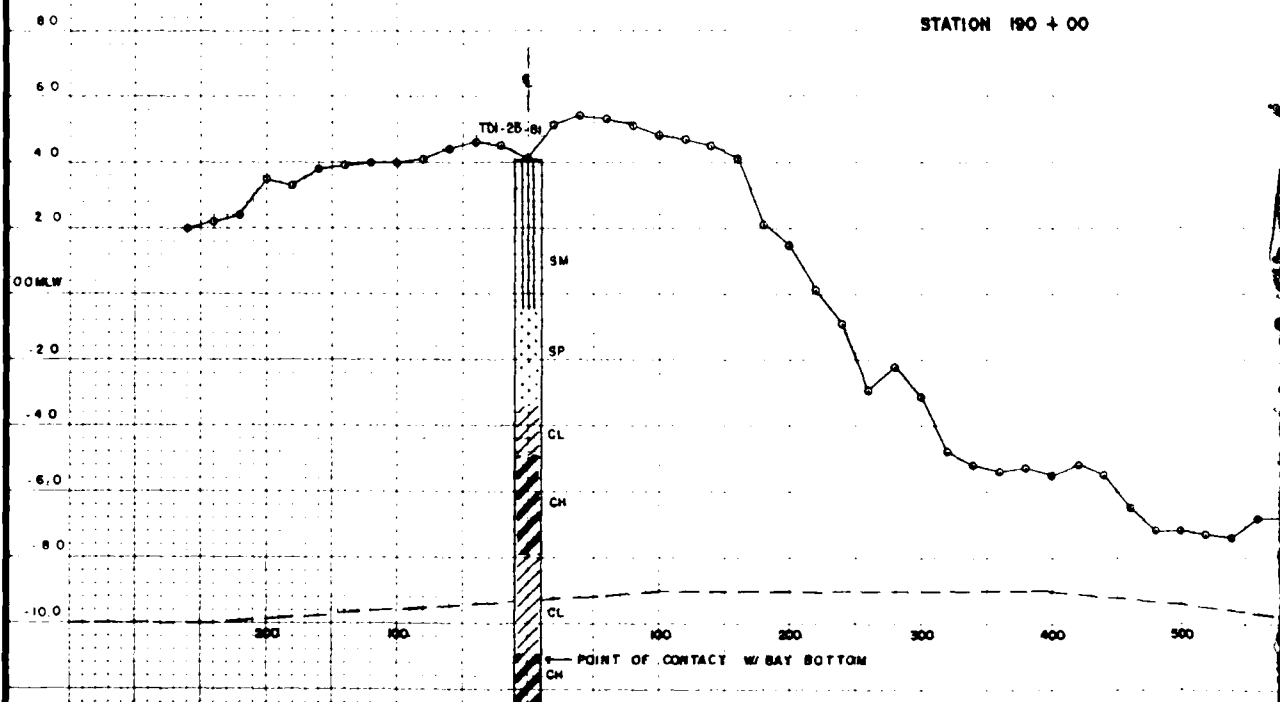
DESIGNED BY EN-FS	U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.		
CHECKED BY	GAillard DISPOSAL ISLAND END OF CONSTRUCTION		
DATE			
APPROVED BY	CROSS SECTIONS		
DATE	DRAWING NO.	DATE	SCALE
		AUGUST 1961	25 OF 45

Figure D26

STATION 185 + 00



STATION 190 + 00



3

2

1

U. S.

REVISIONS			
SYM	ZONE	DESCRIPTION	DATE

STATION 185 + 00

300 400 500 600 700 800

STATION 190 + 00

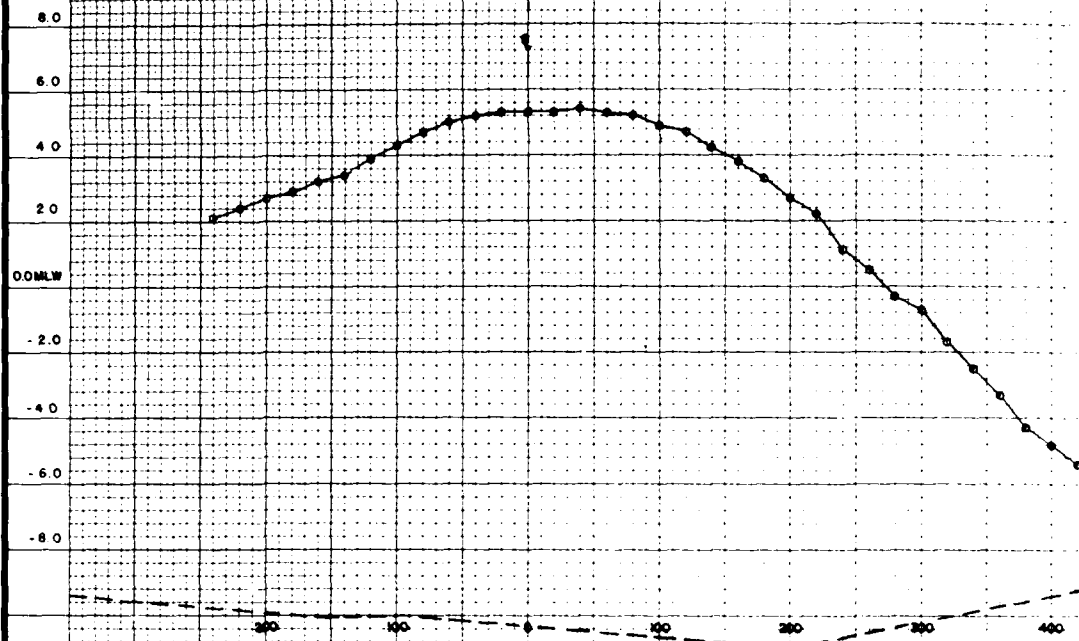
300 400 500 600 700 800

ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

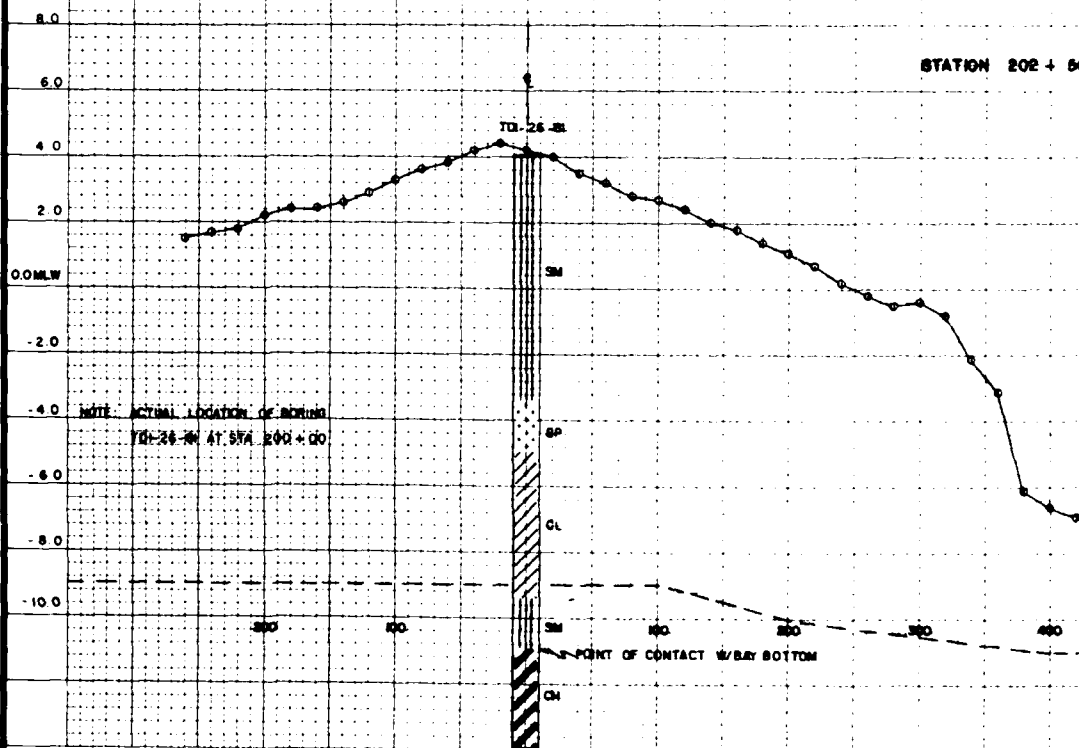
DESIGNED BY EN-F8	U. S. ARMY ENGINEER DISTRICT, MOB CORPS OF ENGINEERS MOBILE, ALA.		
DRAWN BY	GAILLARD DISPOSAL ISLAND END OF CONSTRUCTION		
CHECKED BY	CROSS SECTIONS		
APPROVED BY	DATE	SCALE	BY
	AUGUST 1961		

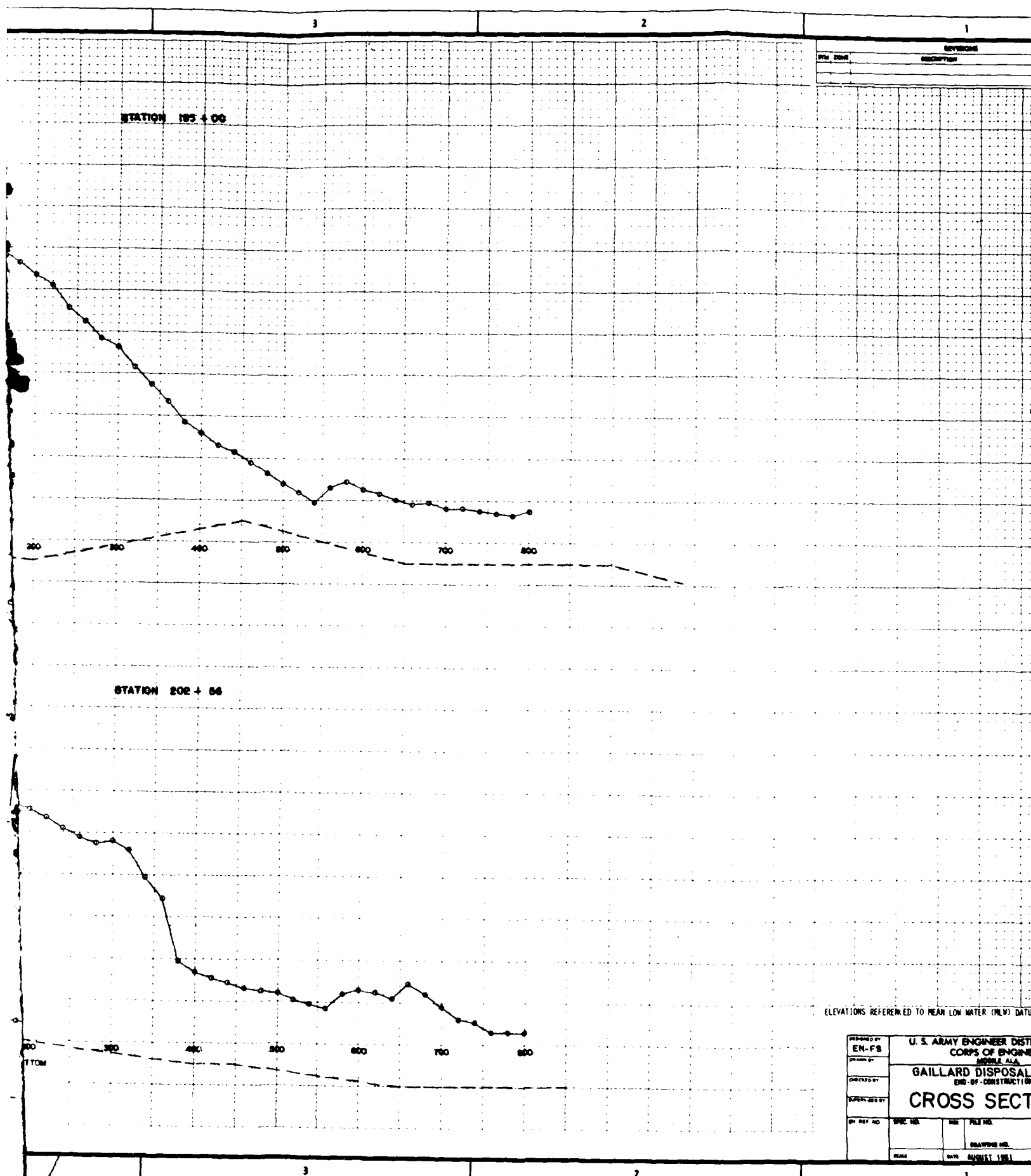
Figure D27

STATION 195 + 0



STATION 202 + 04

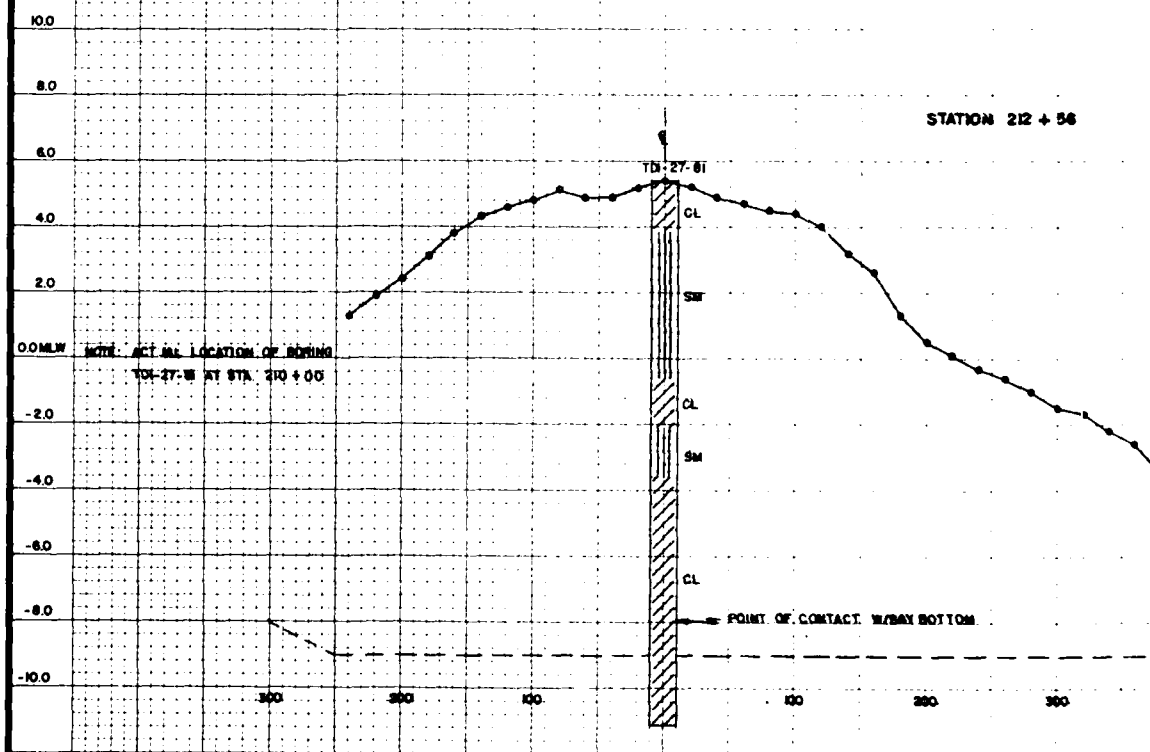
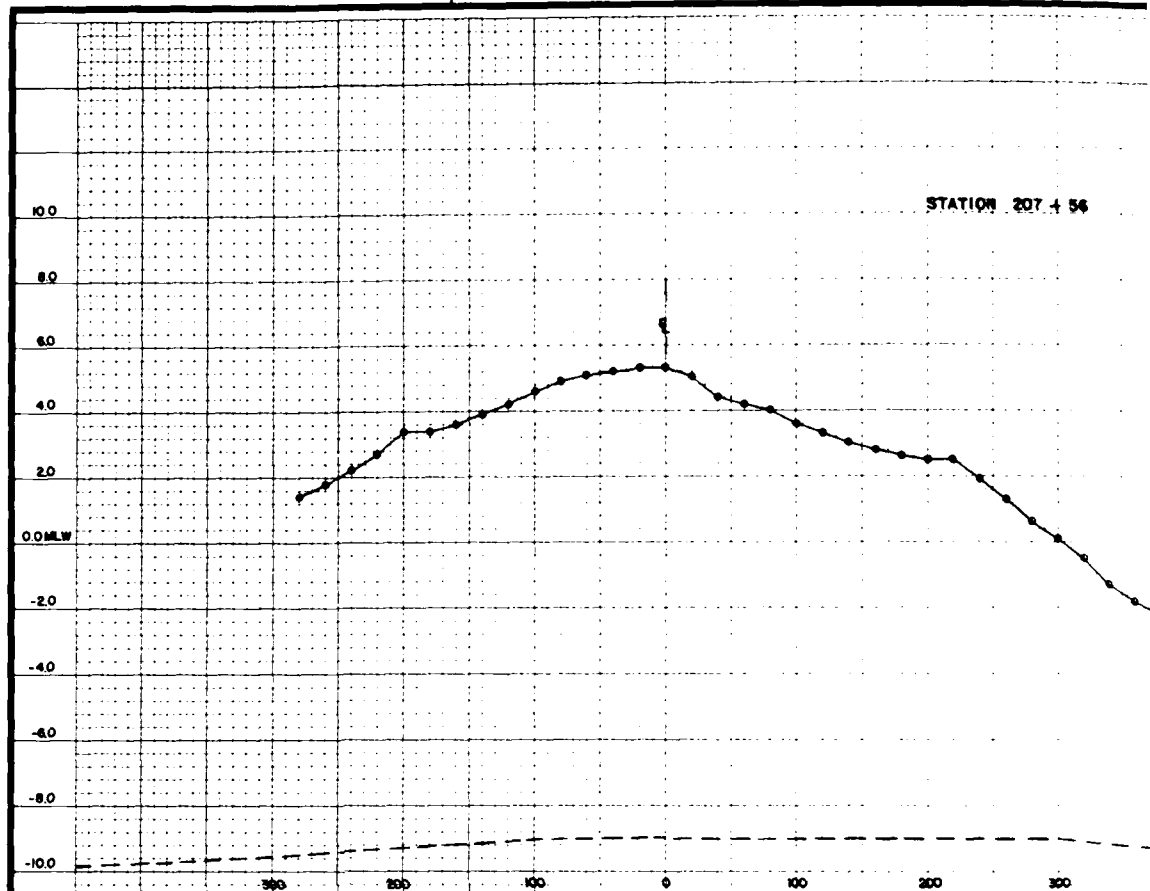




ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY EN-FS	U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALA.			
CHECKED BY	GAILLARD DISPOSAL END-OF-CONSTRUCTION			
SUPervised BY	CROSS SECTION			
DATE	SCALE	DATE	FILE NO.	DRAWING NO.
		AUGUST 1961		

2 Figure D28



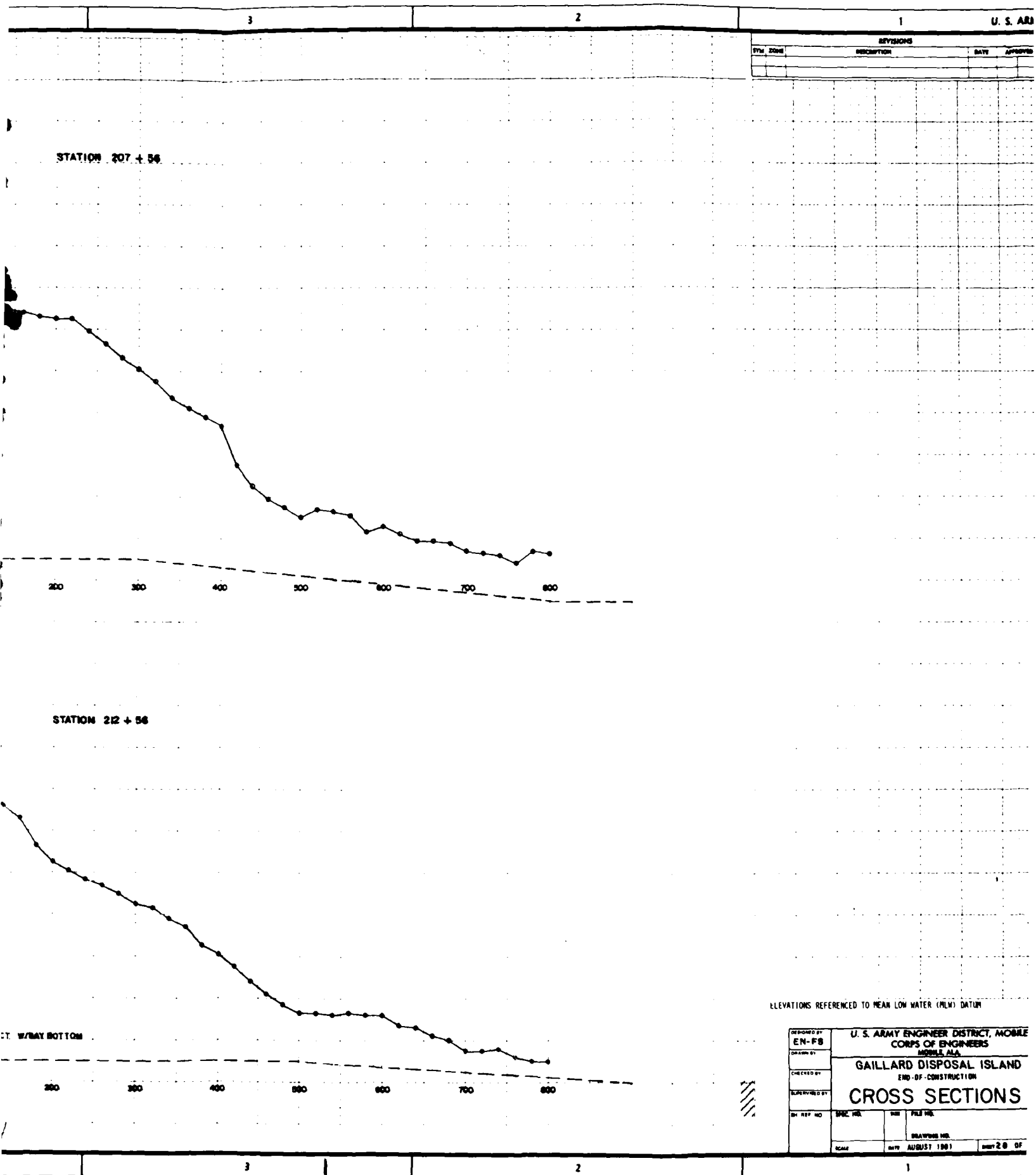
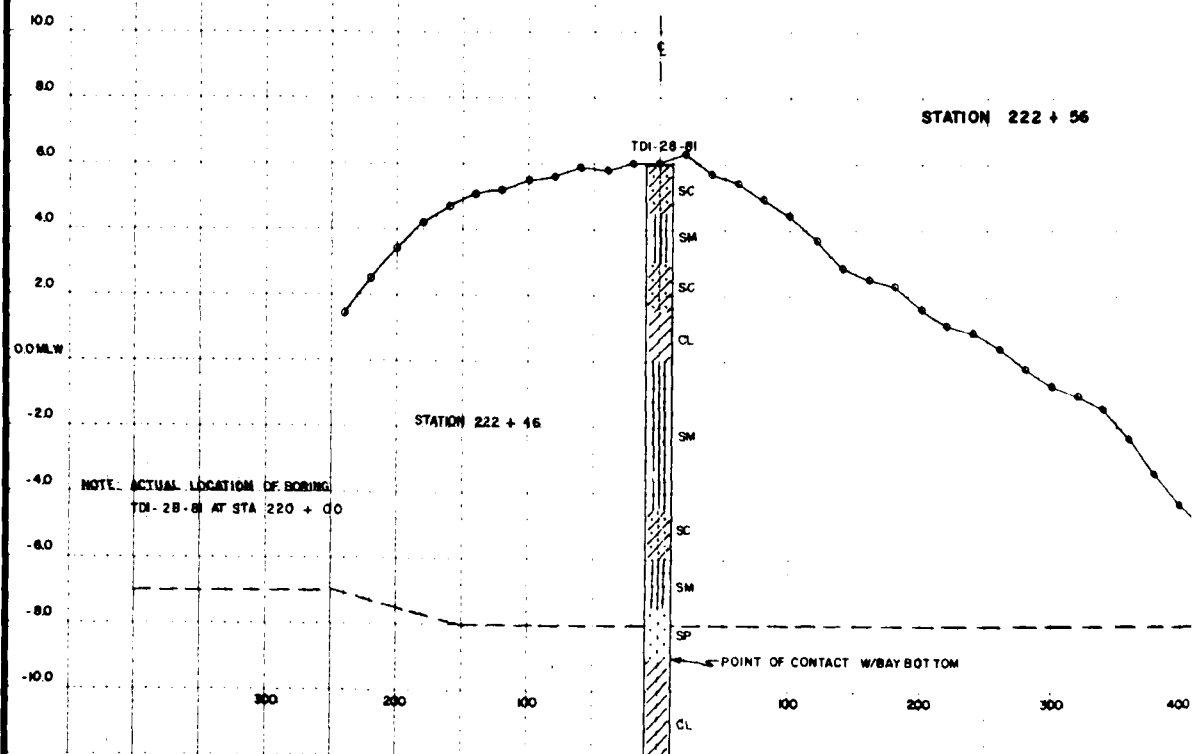
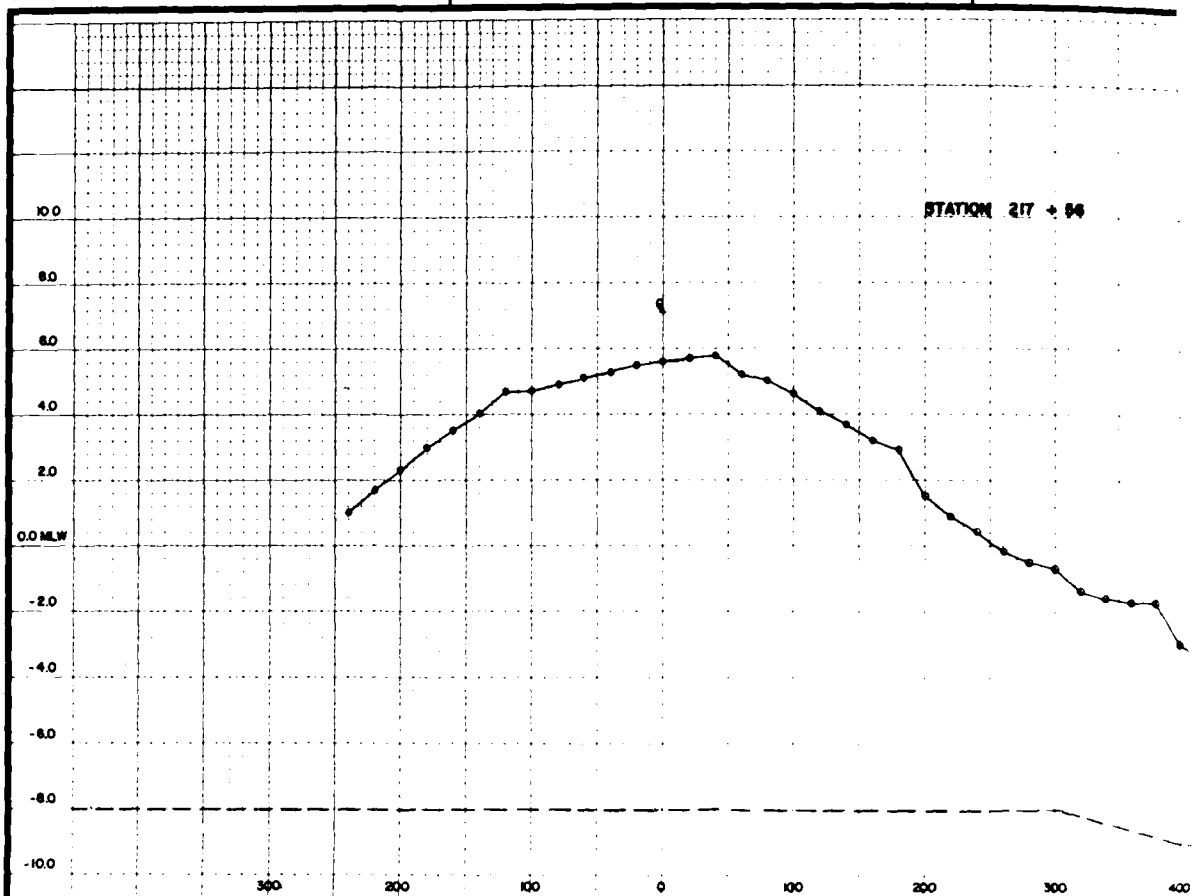


Figure D29



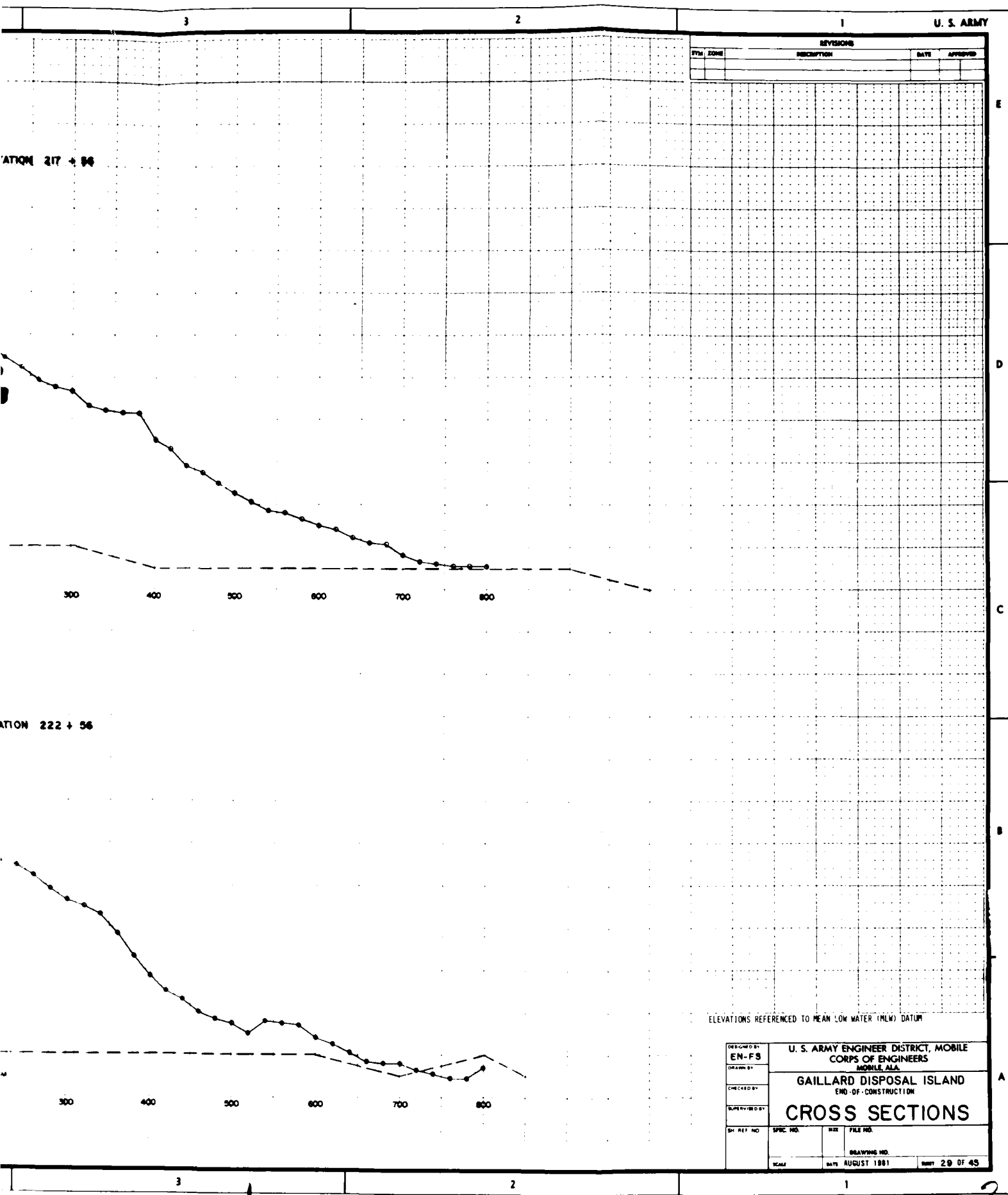
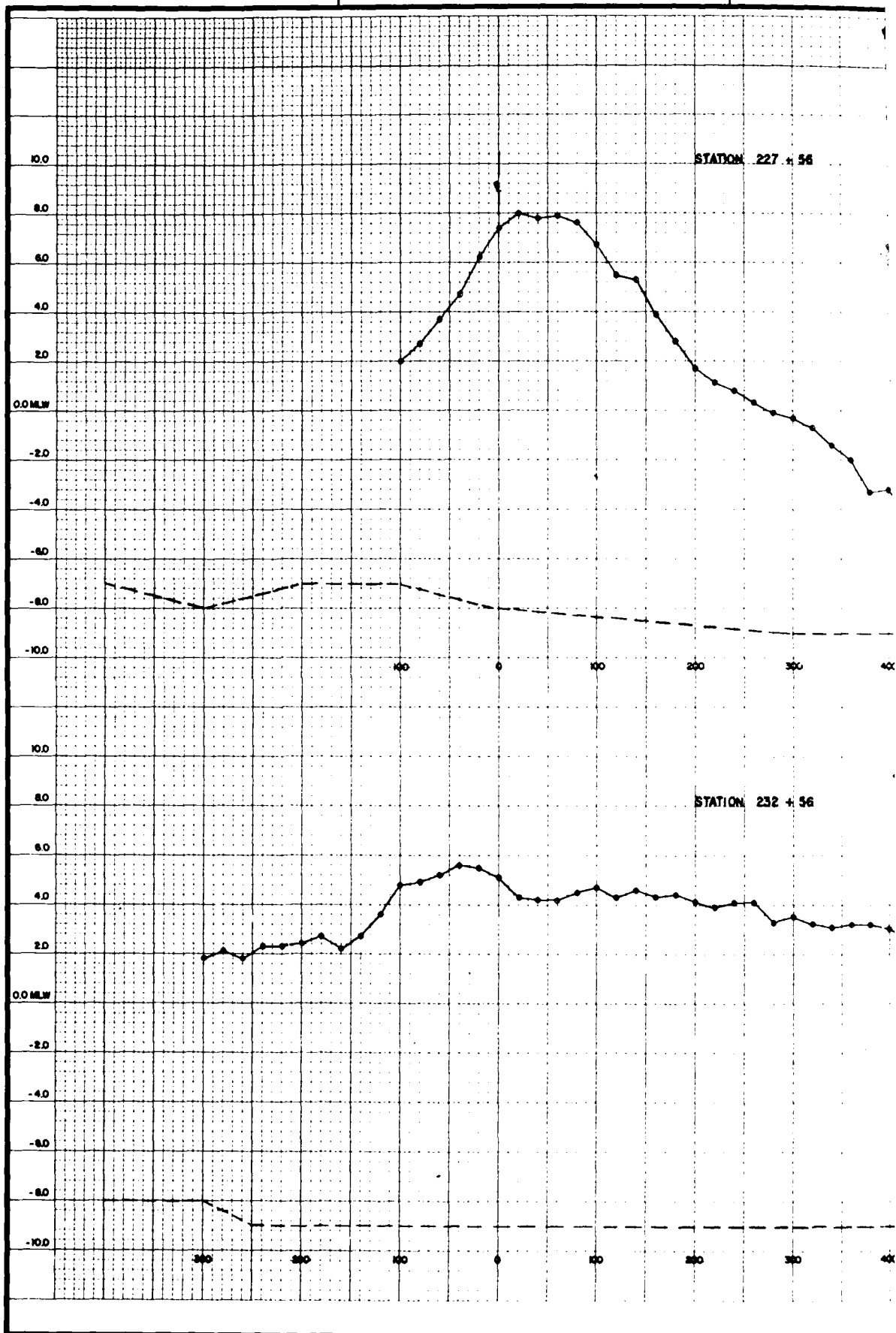


Figure D30

2



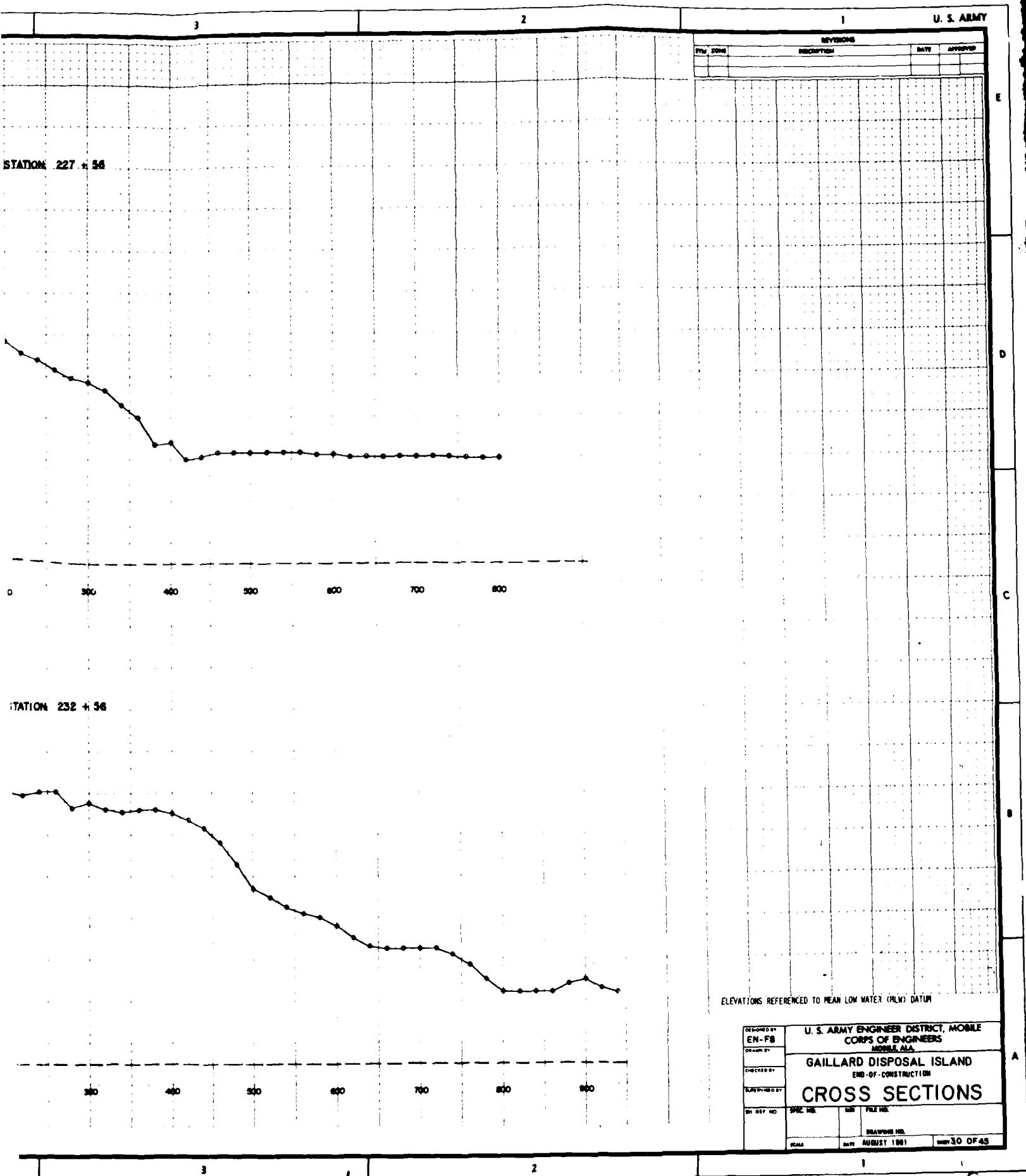
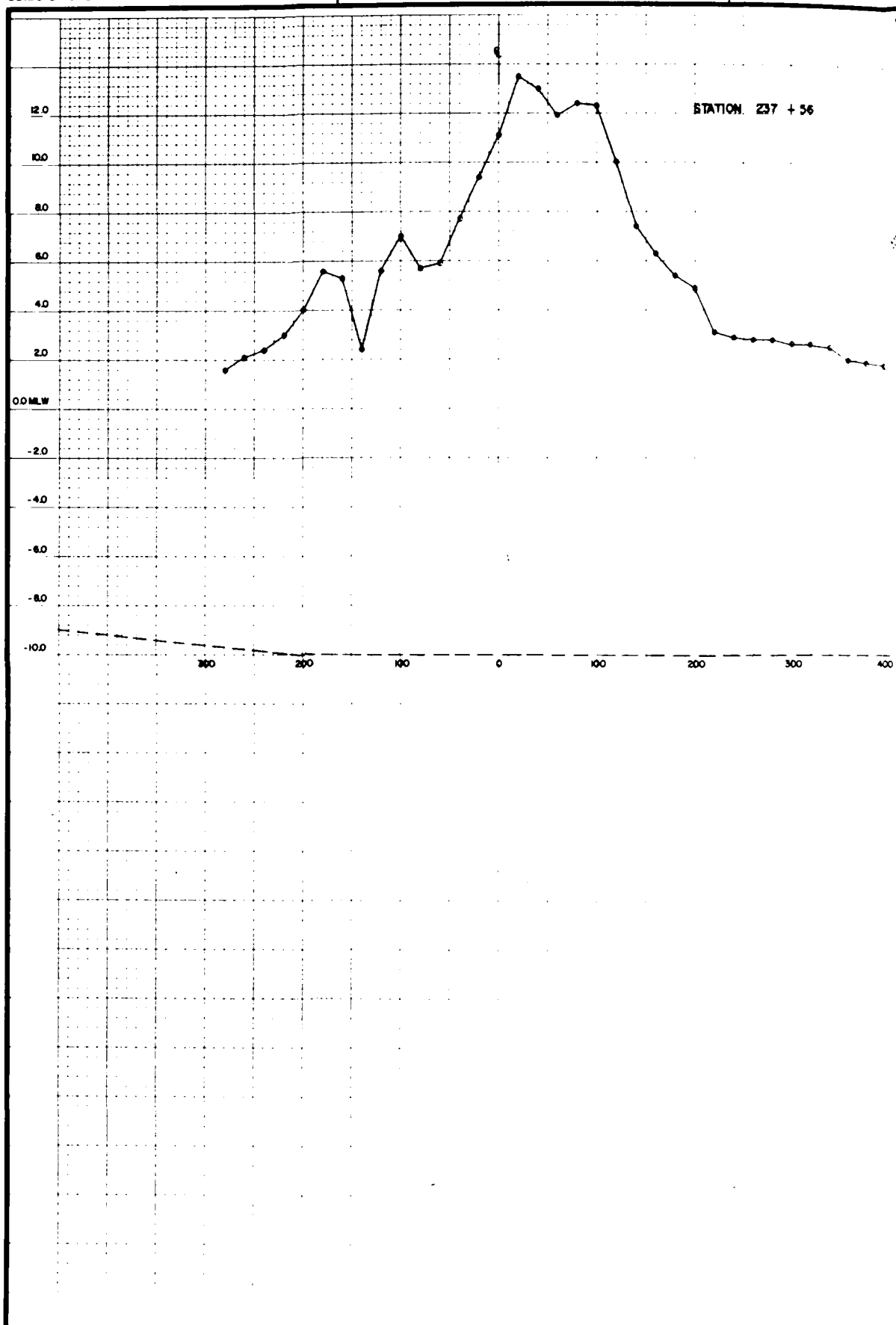
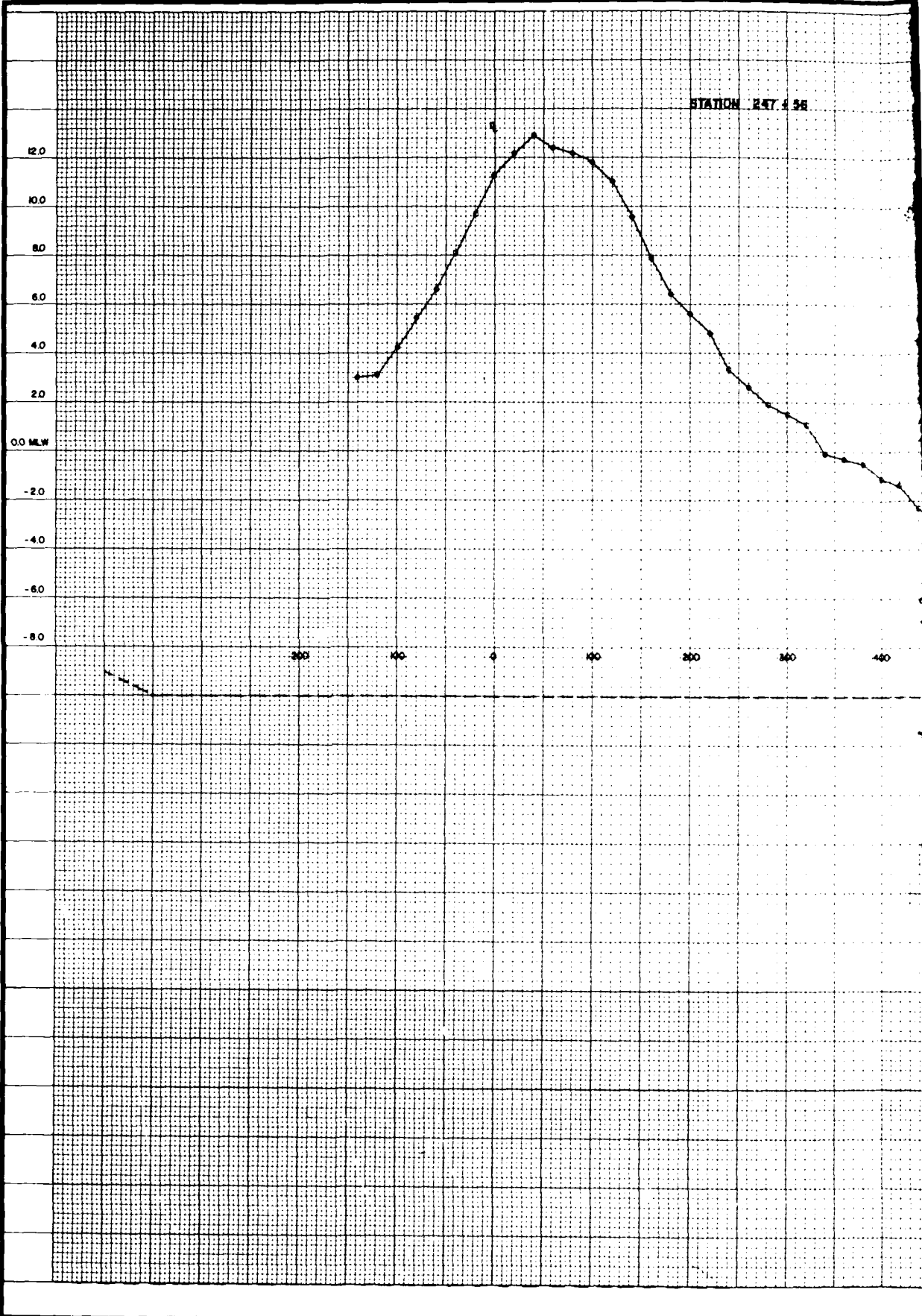


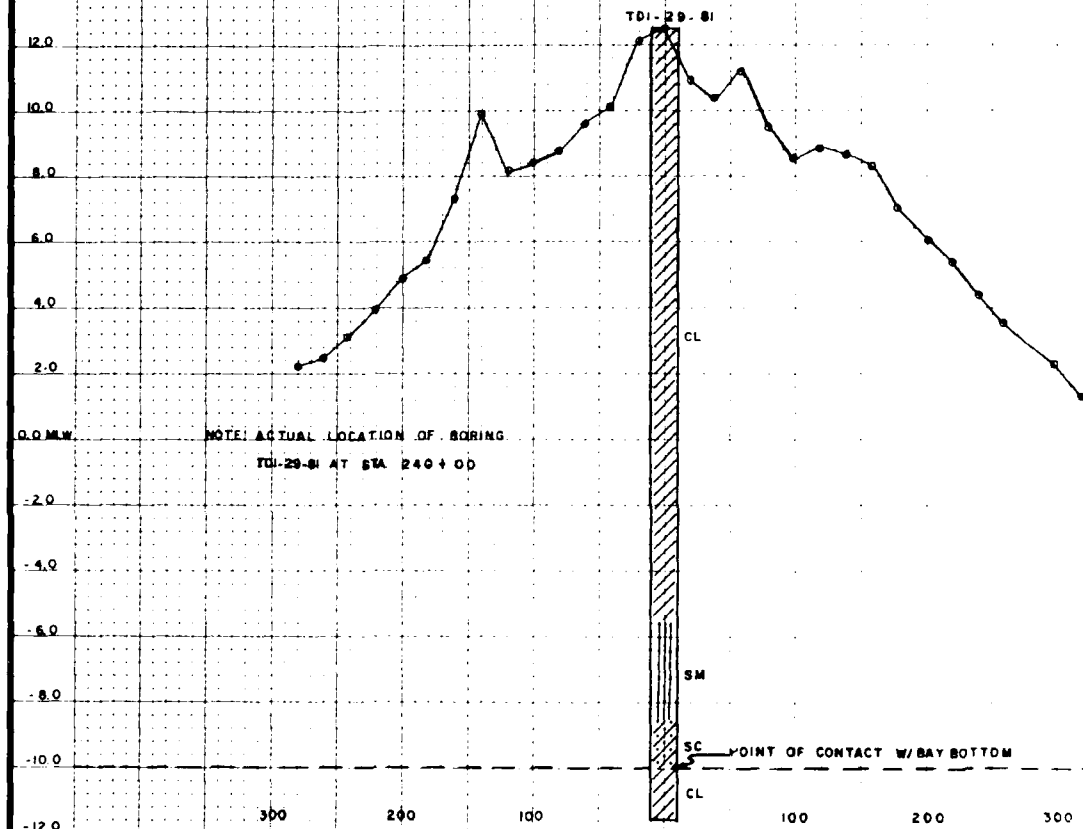
Figure D31



STATION 247.456



STATION 242 + 56



AD-A173 512

VERIFICATION OF DESIGN AND CONSTRUCTION TECHNIQUES FOR
CALLARD ISLAND DR. (U) ARMY ENGINEER WATERWAYS

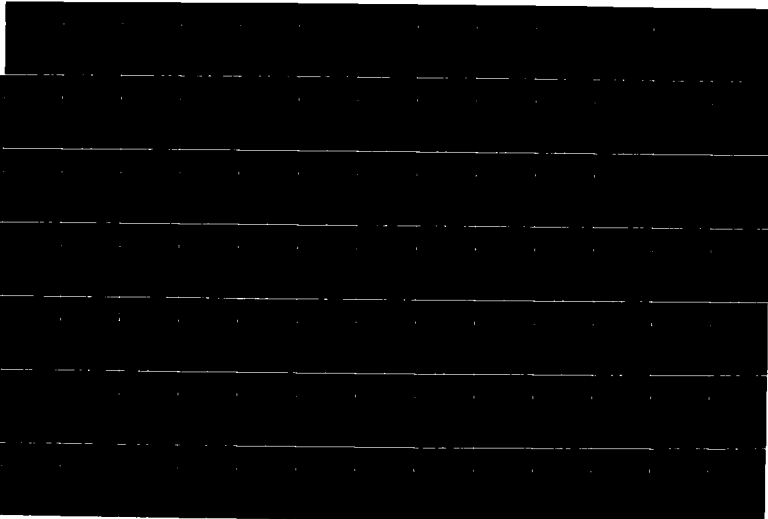
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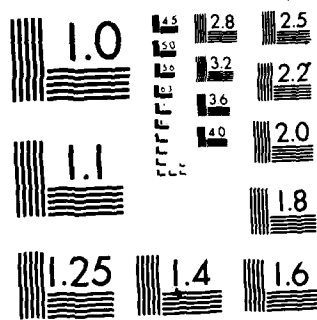
UNCLASSIFIED

EXPERIMENT STATION VICKSBURG MS 39071
J FOWLER ET AL. AUG 86 WES/MP/GL-86-26

F/G 13/2

NL

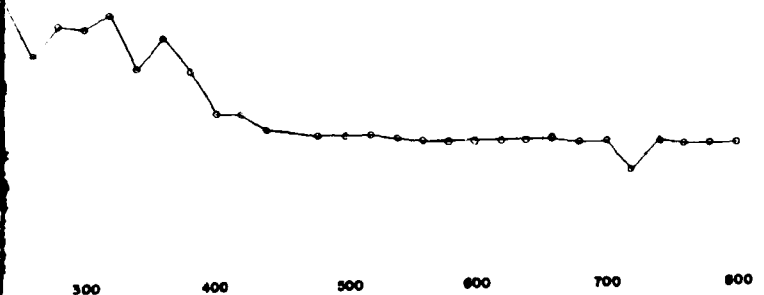




MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

REVISIONS			
SYM	ZONE	DESCRIPTION	DATE APPROVED

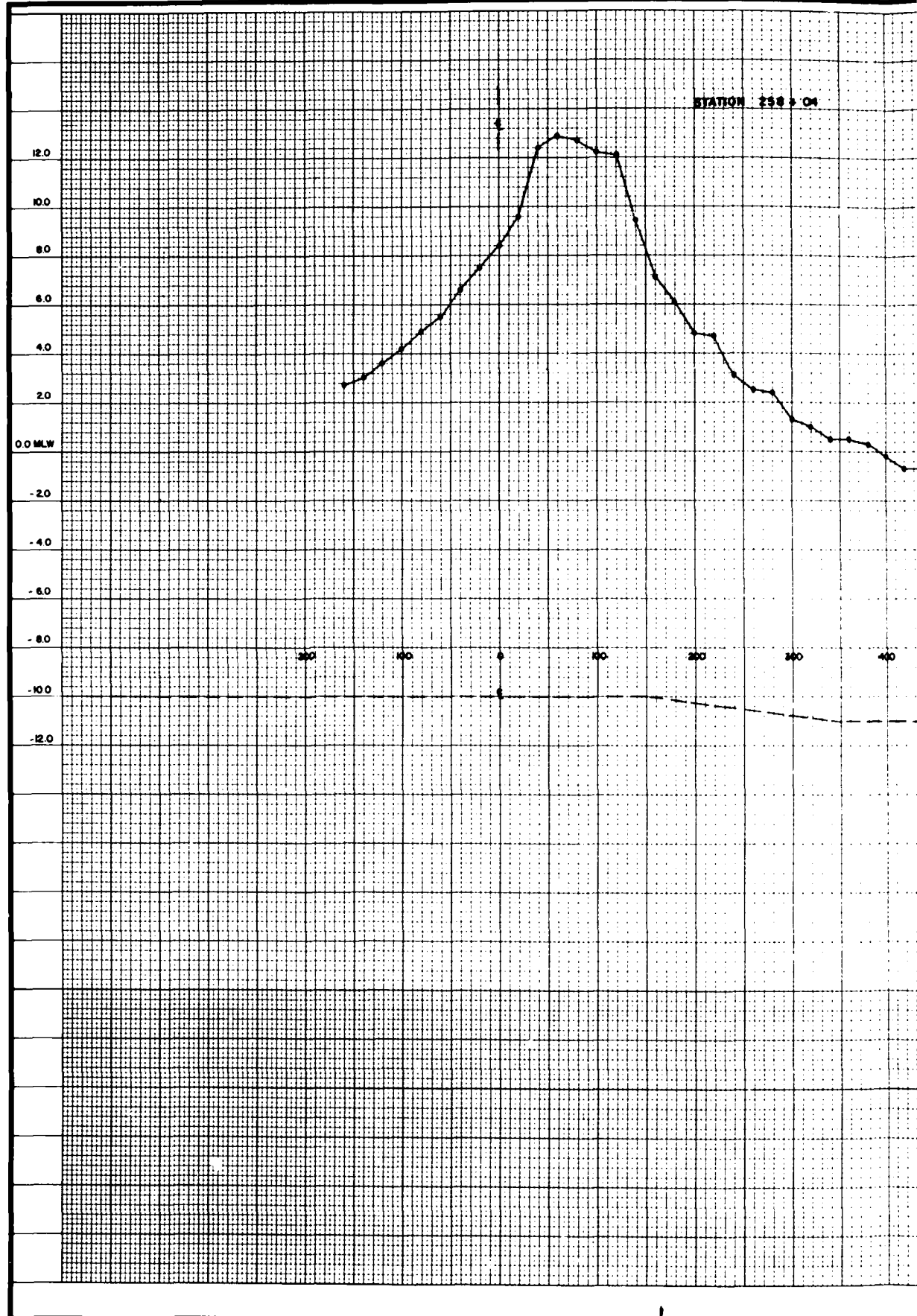
252 + 56

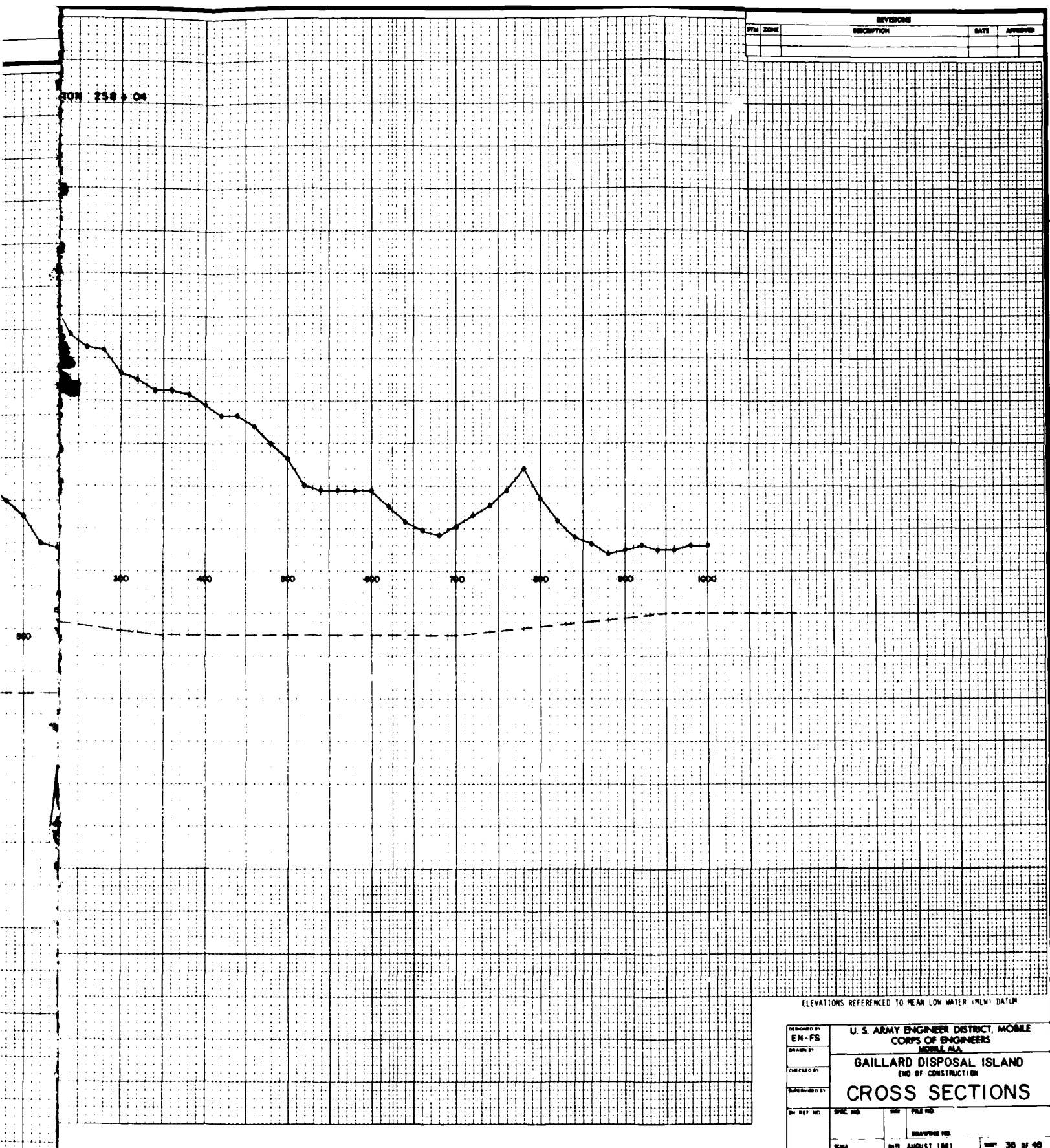


ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY EN - FS	U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.		
DRAWN BY	GAILLARD DISPOSAL ISLAND END-OF-CONSTRUCTION		
CHECKED BY	CROSS SECTIONS		
DATE REVIEWED BY			
SH. REF. NO.	SPEC. NO.	SHEET	FILE NO.
			DRAWING NO.
SCALE	DATE	AUGUST 1981	
		SHEET 34 OF 4	

Figure D35



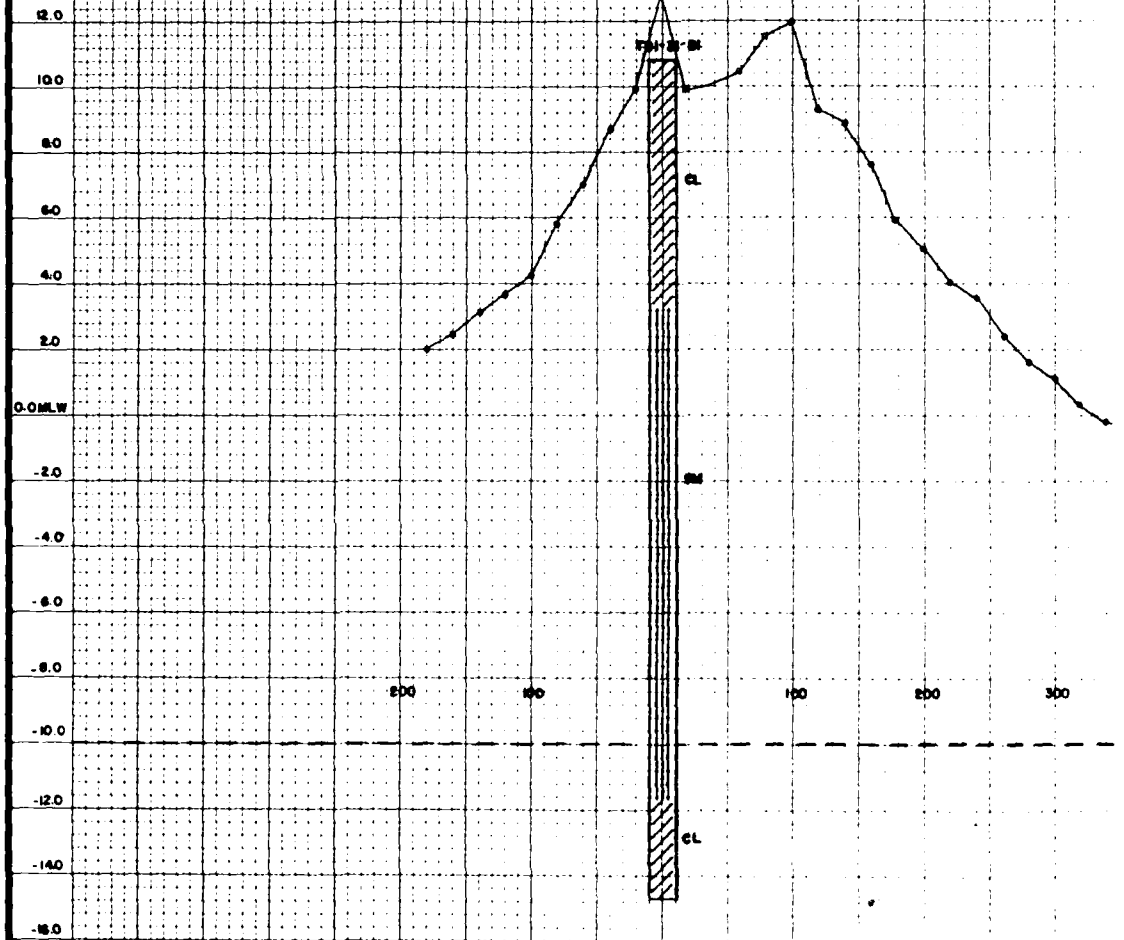


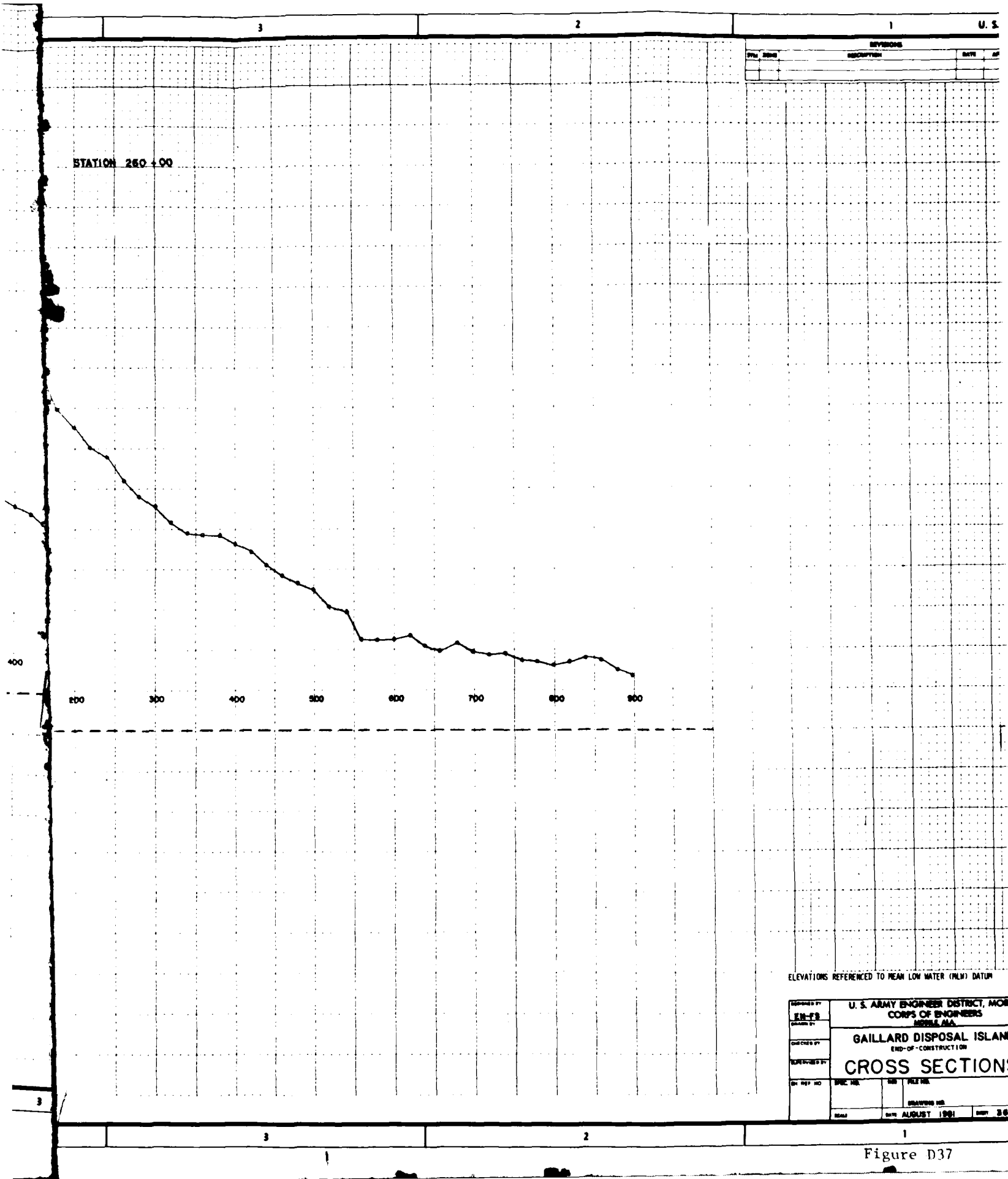
REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED

DESIGNED BY EN-FS				U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.			
CHECKED BY				GAILLARD DISPOSAL ISLAND END OF CONSTRUCTION			
SUPERVISED BY				CROSS SECTIONS			
BY REF NO.	SPEC. NO.	DATE	FILE NO.	BY REF NO.	SPEC. NO.	DATE	FILE NO.

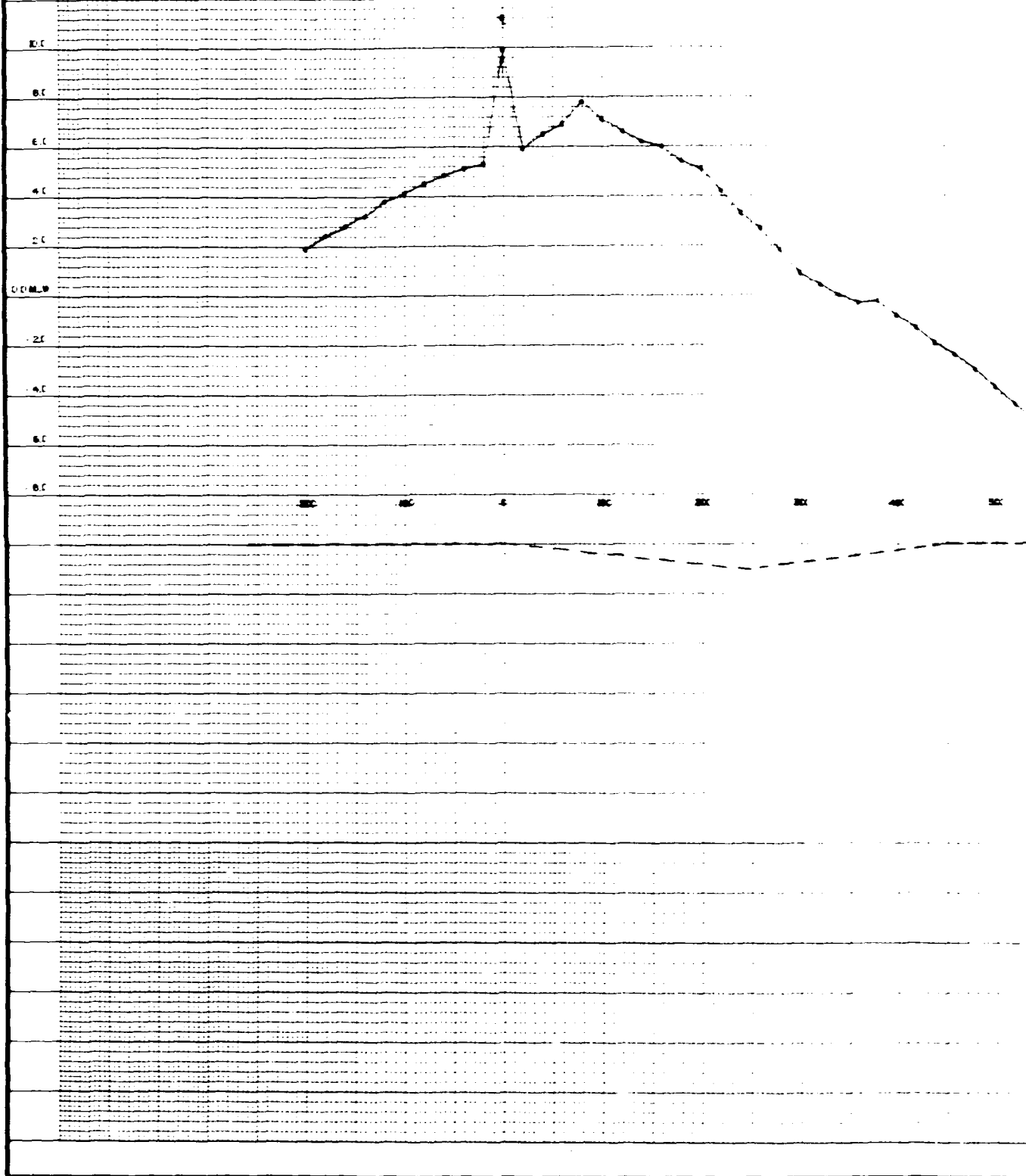
Figure D36

STATION 260+00

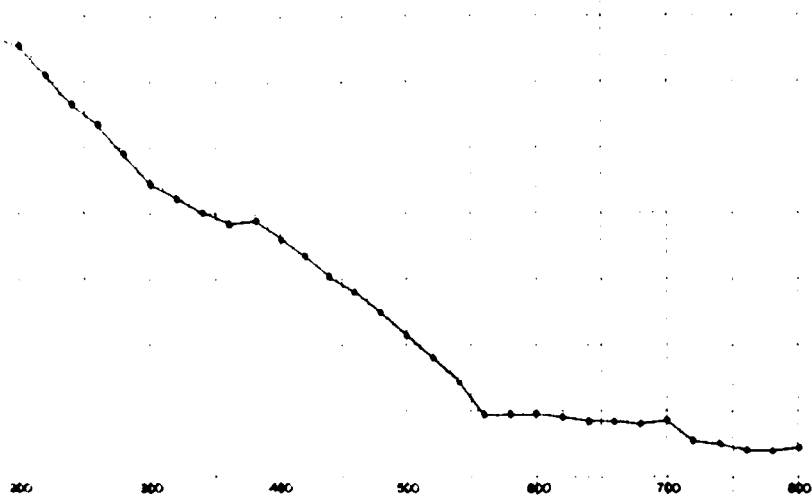




STATION 262 + 00



STATION 265 + 00

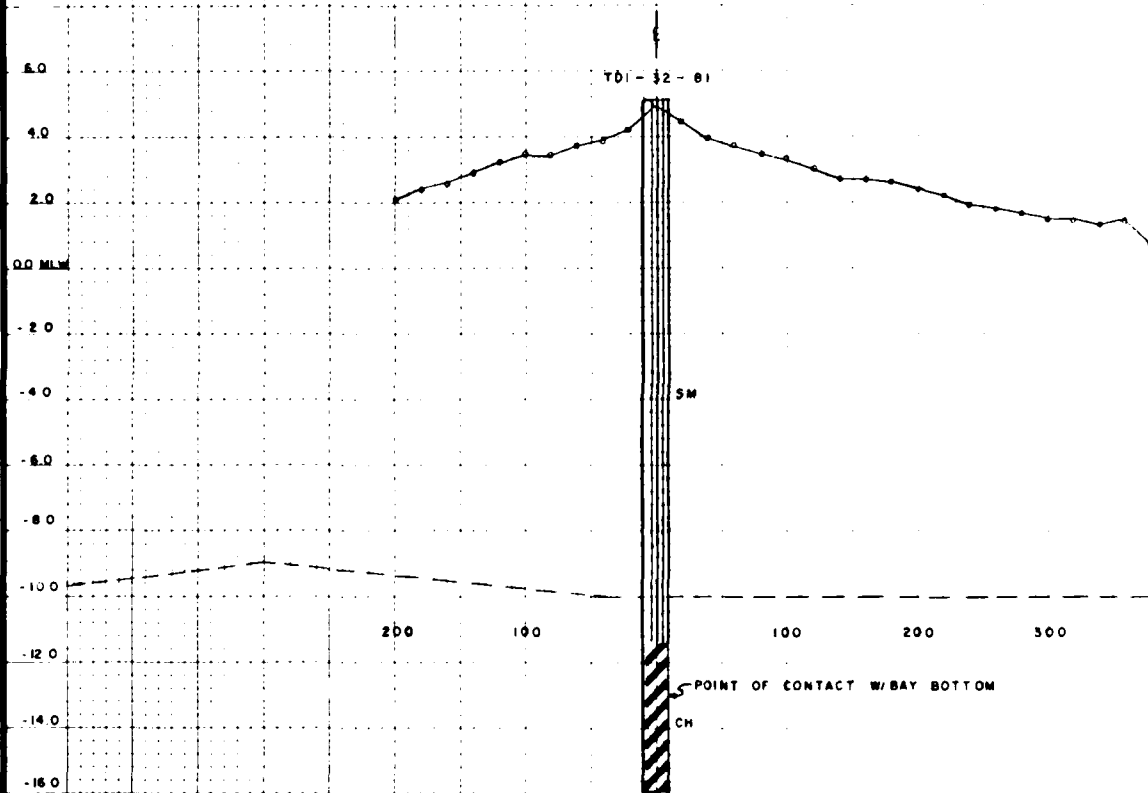


ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY EN-FB				U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.			
CHECKED BY				GAILLARD DISPOSAL ISLAND END OF CONSTRUCTION			
SUPERVISED BY				CROSS SECTIONS			
DATE	BY	SCALE	NO.	DATE	BY	SCALE	NO.
				AUGUST 1961			ST. OF

Figure D38

STATION 270 + 00



STATION

REVISIONS
RECEPTION

DATE APPROVED

STATION 270 + 00

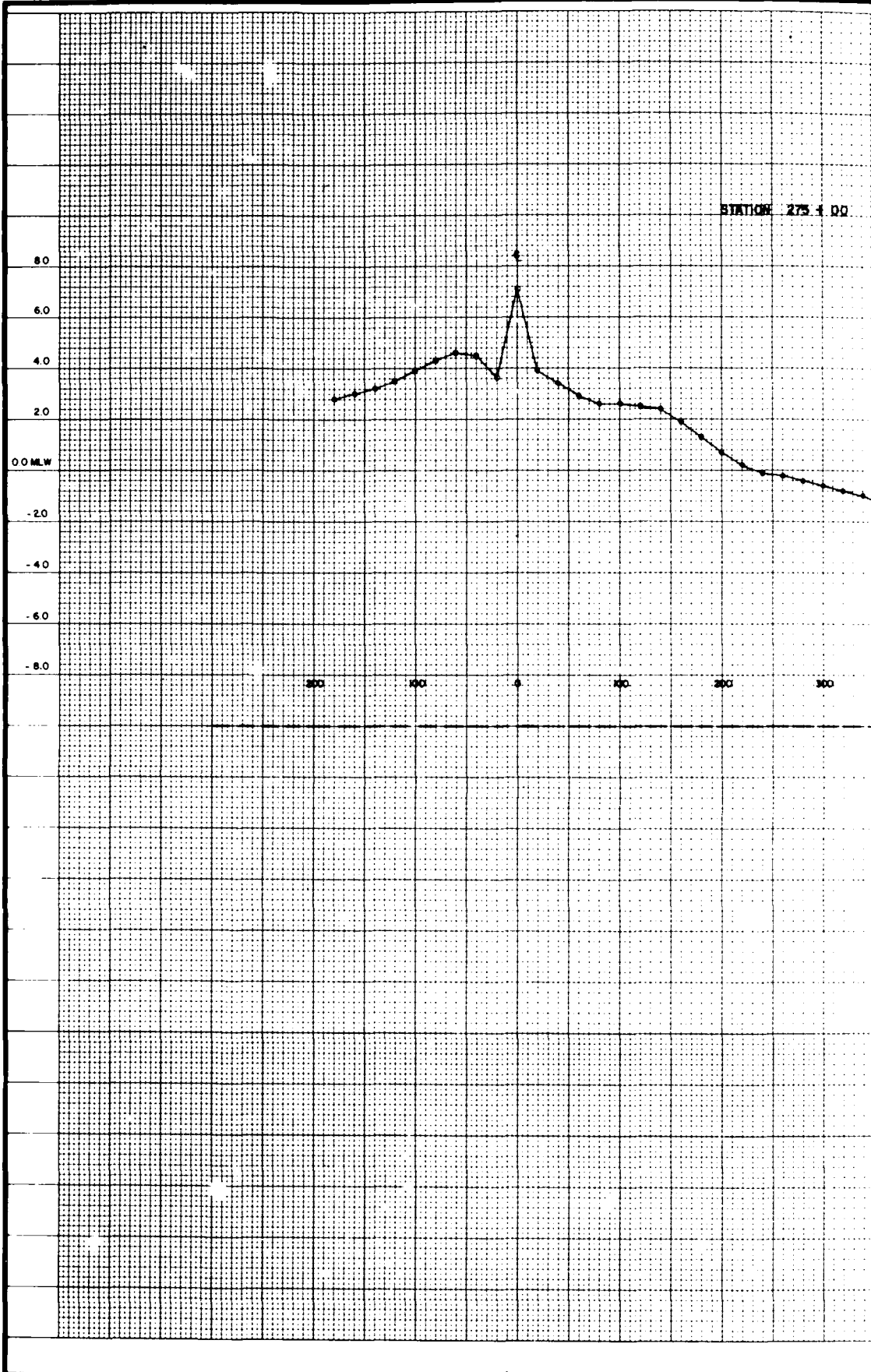
200 300 400 500 600 700

W/ BAY BOTTOM

ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY EN-PS	U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.			
CHECKED BY	GAILLARD DISPOSAL ISLAND END-OF-CONSTRUCTION			
SUPPLIED BY	CROSS SECTIONS			
BY REF NO	SPEC NO	REV	FILE NO	DRAWING NO
				DATE AUGUST 1961
				SHEET 38 OF 46

Figure D39



REVISIONS			
REV.	DATE	DESCRIPTION	APPROVED

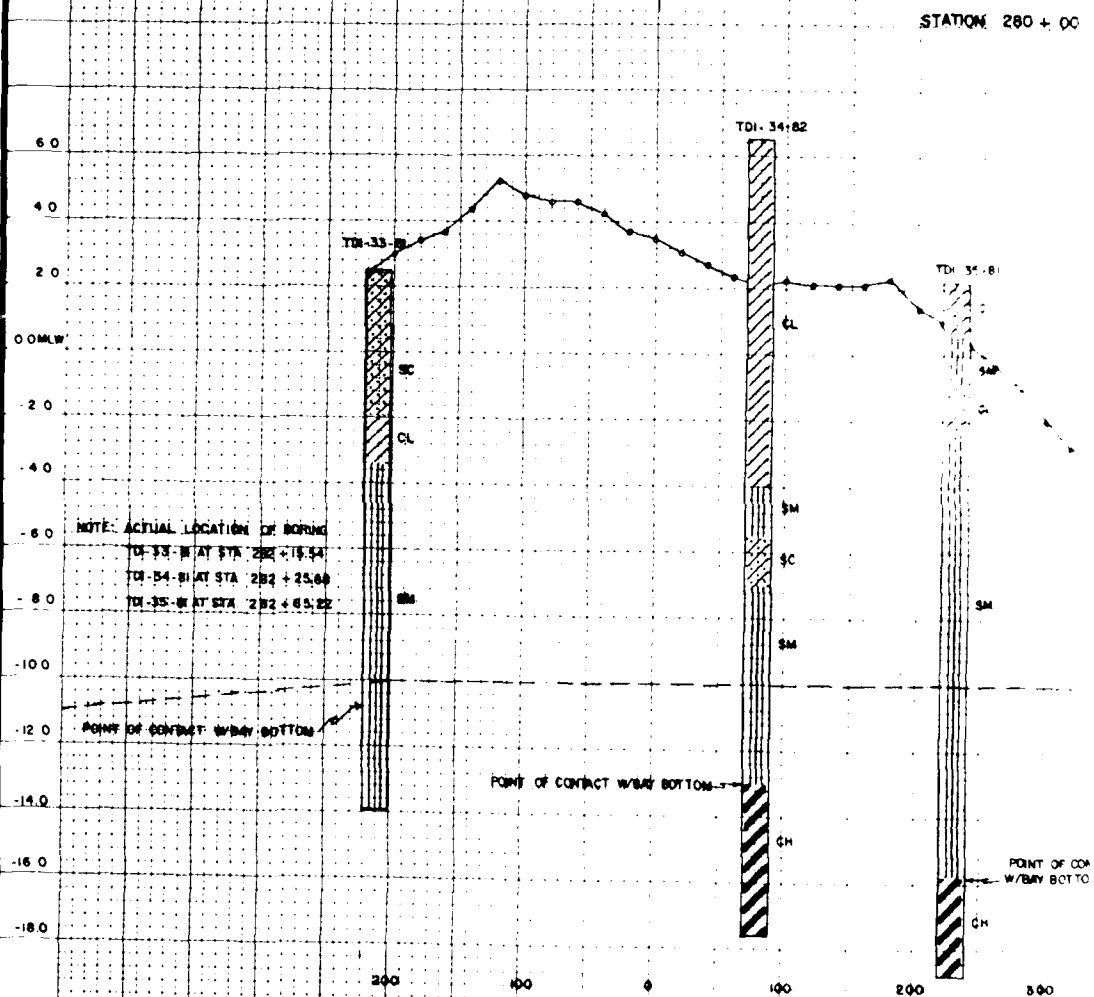
1000 275.1 00

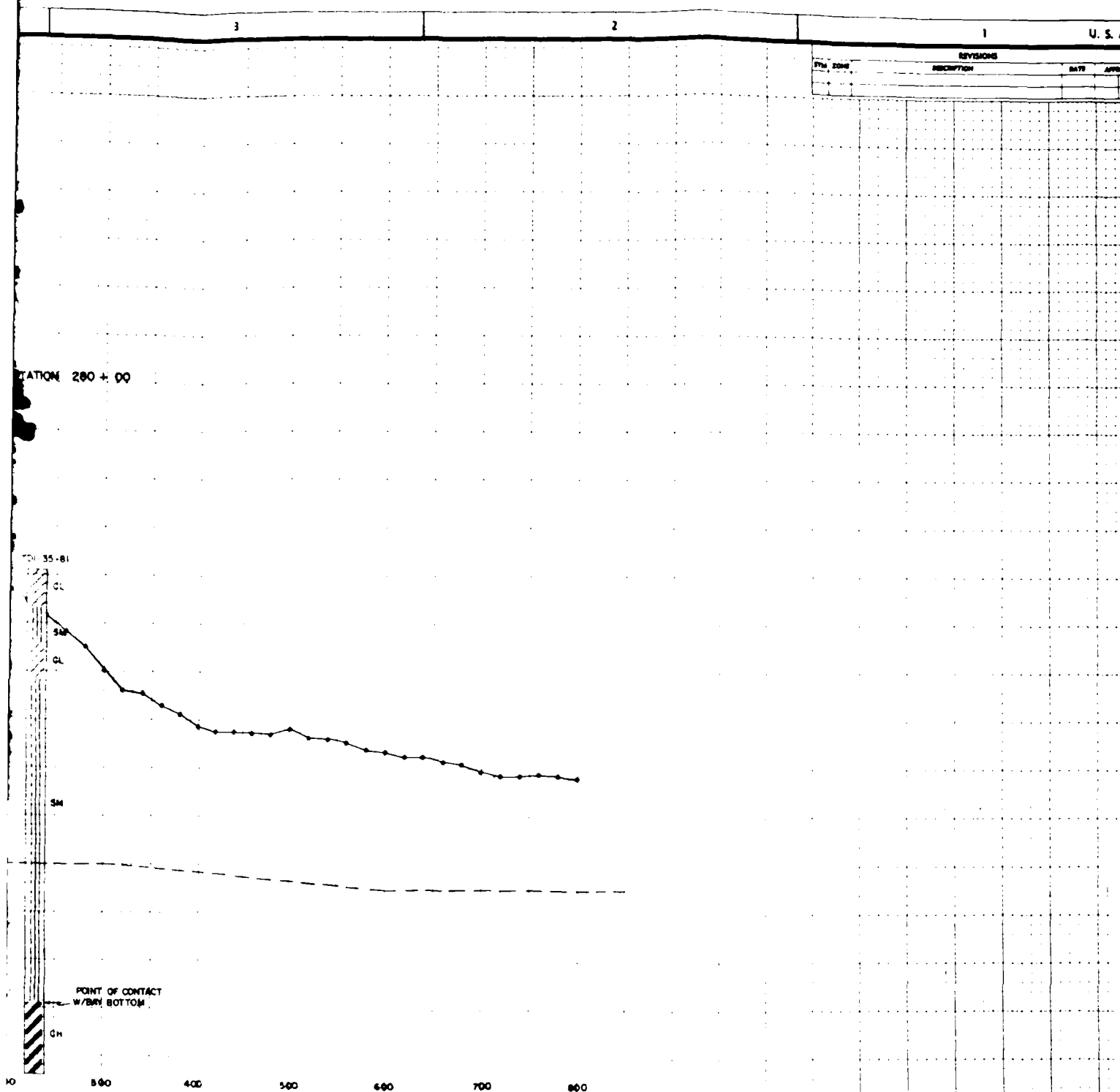
300 400 500 600 700 800

ELEVATION REFERENCED TO MEAN LOW WATER M.W. DATUM

U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.			
GAILLARD DISPOSAL ISLAND END OF CONSTRUCTION			
CROSS SECTIONS			
DESIGNED BY EN-FS	SPEC. NO.	SHEET NO.	FILE NO.
DRAWN BY	DATE	SCALE	REVISIONS
CHECKED BY	DATE	SCALE	REVISIONS
APPROVED BY	DATE	SCALE	REVISIONS

Figure p40

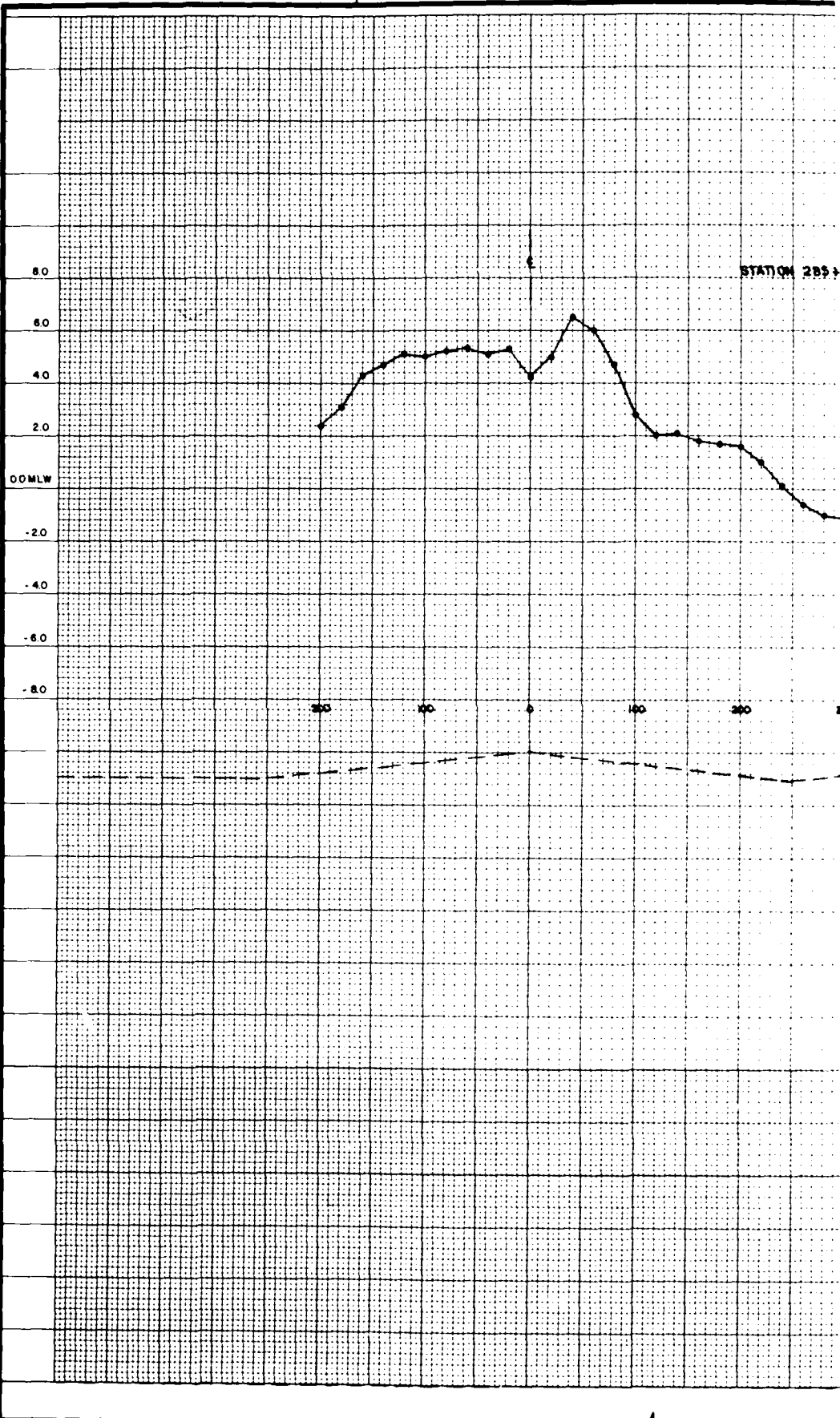




ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DA

DESIGNED BY E.N.-FS		U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.	
CHECKED BY		GAILLARD DISPOSAL ISLAND END-OF-CONSTRUCTION	
SURVEYED BY		CROSS SECTIONS	
BY: INT. NO.	SEC. NO.	DATE	PLATE NO.
		AUGUST 1961	40

Figure D41 2



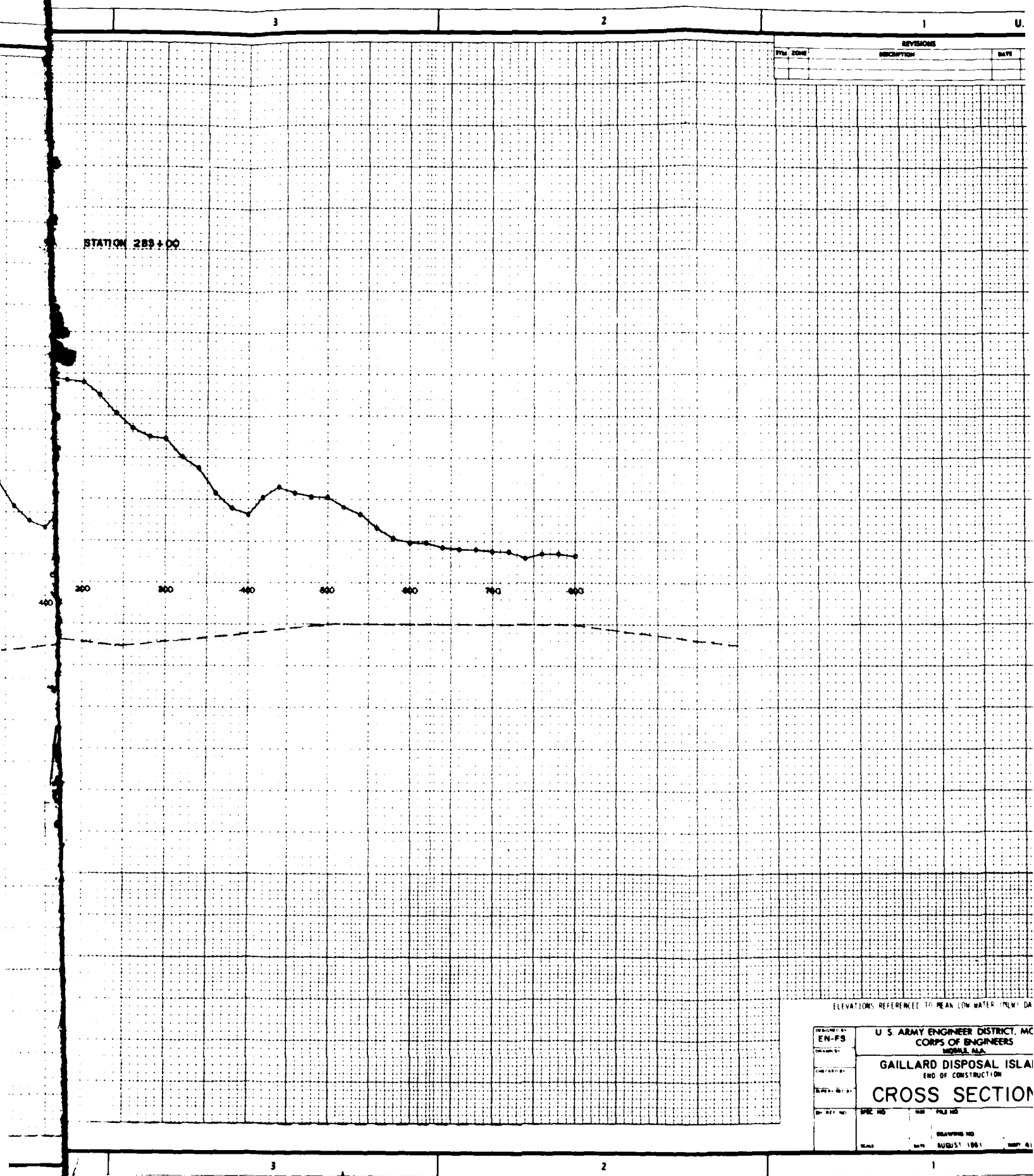
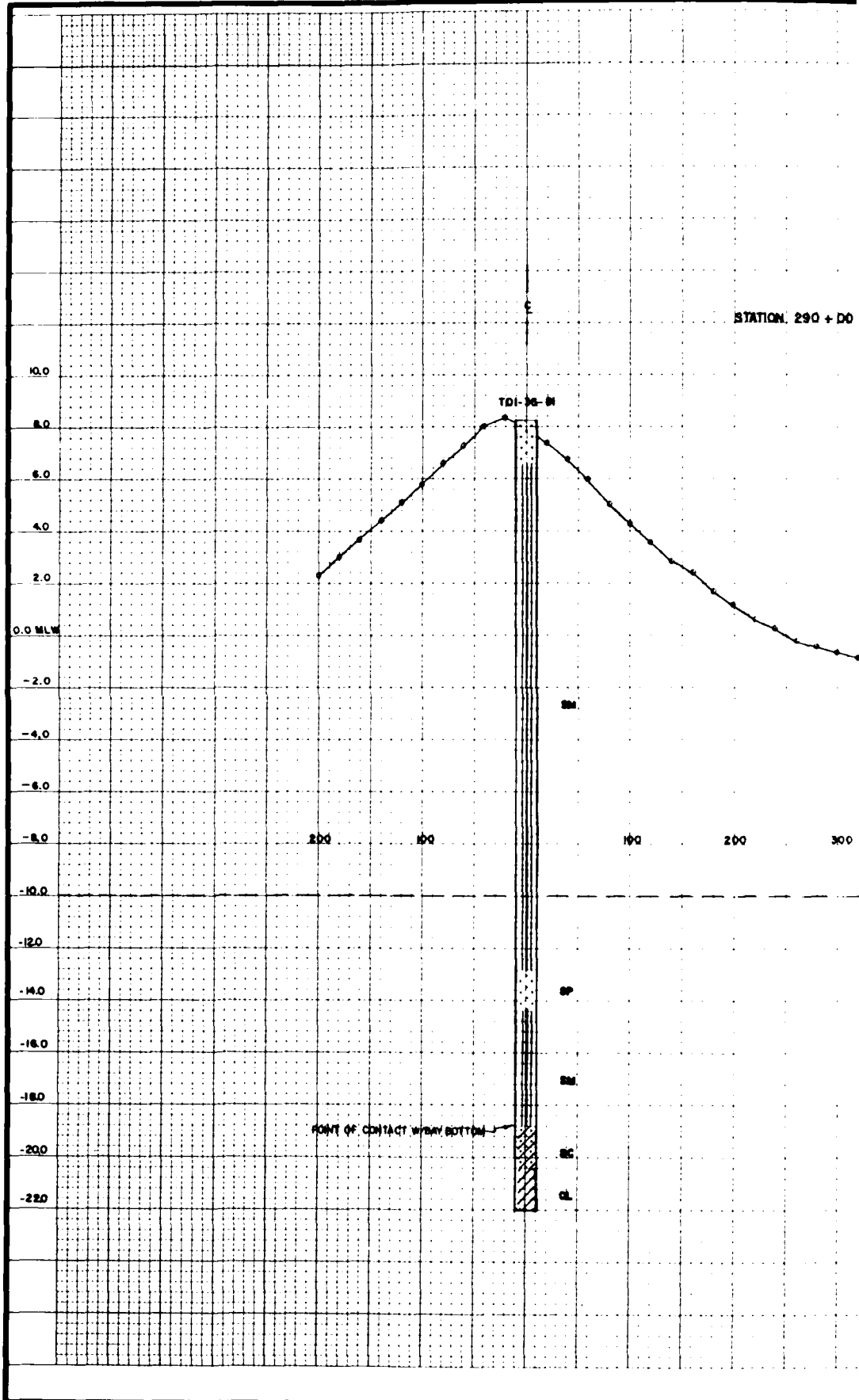


Figure D42

CORPS OF ENGINEERS

4

STATION 290 + 00



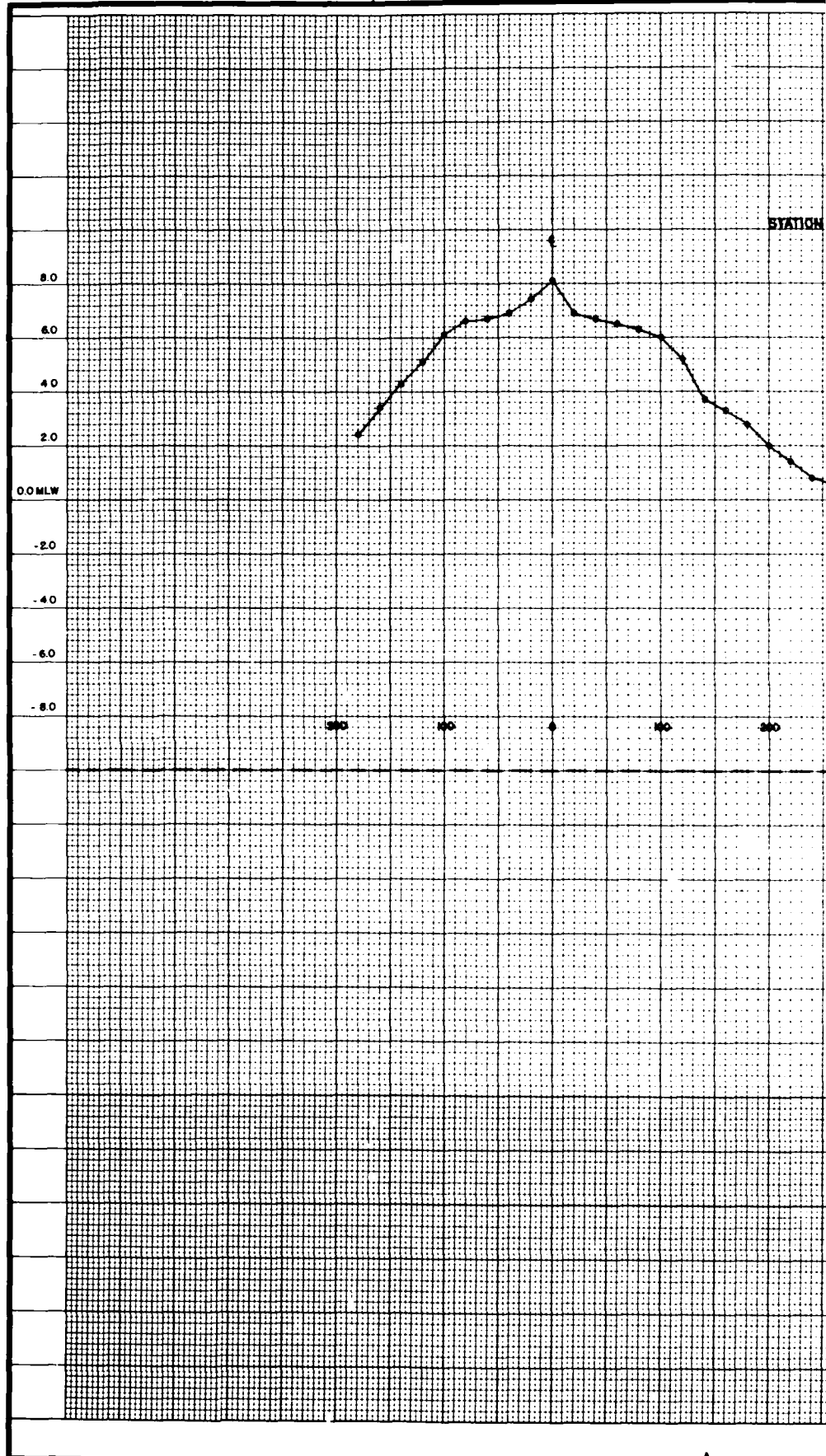
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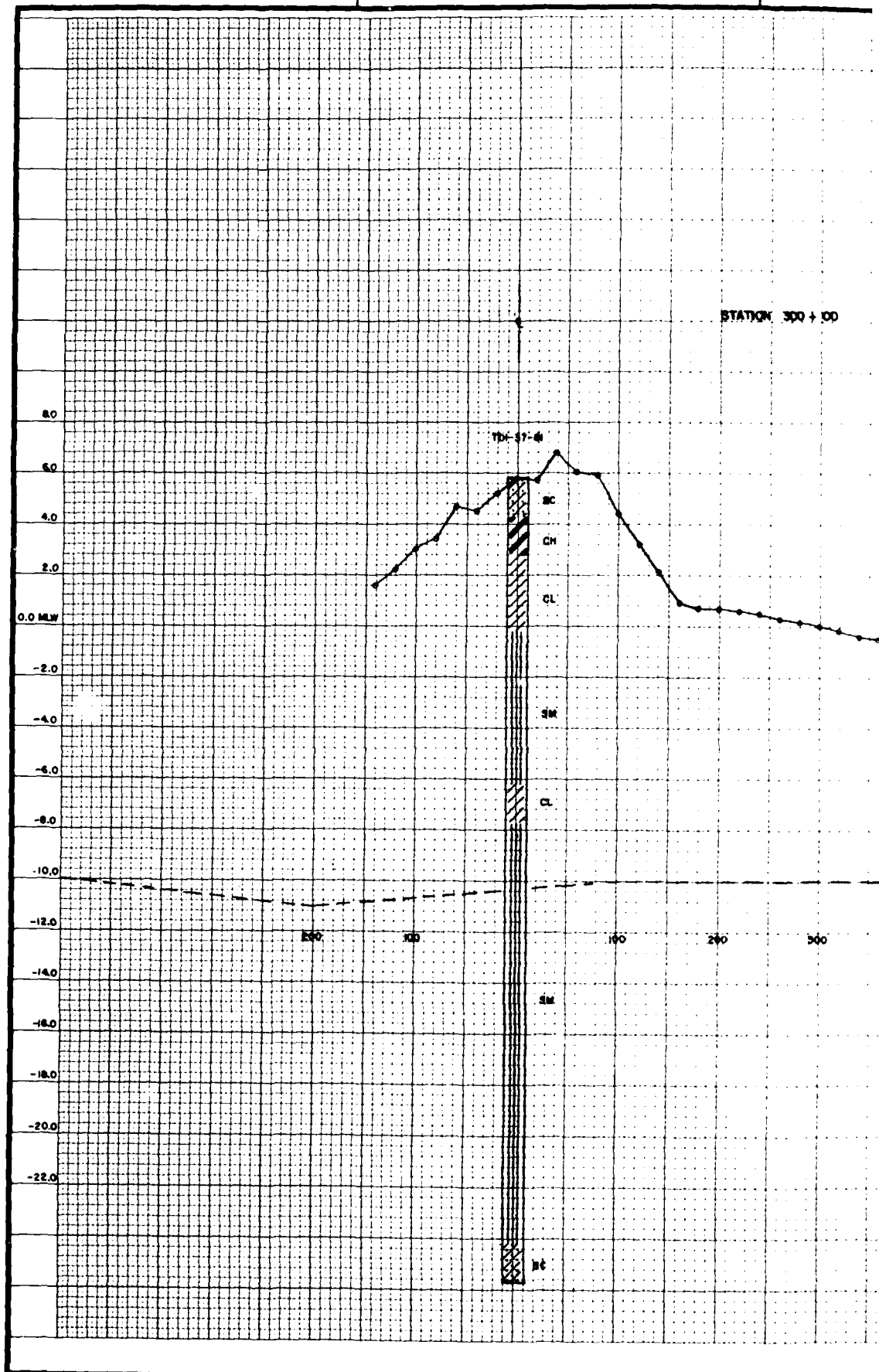
4

STATION. 290 + 00

ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY	U. S. ARMY ENGINEER DISTRICT, MOBILE		
EN-PS	CORPS OF ENGINEERS		
DESIGNED BY	MOBILE, ALA.		
CHECKED BY	GAILLARD DISPOSAL ISLAND		
	END-OF-CONSTRUCTION		
SCALE	CROSS SECTIONS		
BY REF NO	SHEET NO.	DATE	FILE NO.
	DRAWN BY		
SCALE	DATE	AUGUST	1966
			SHEET 48 OF 48





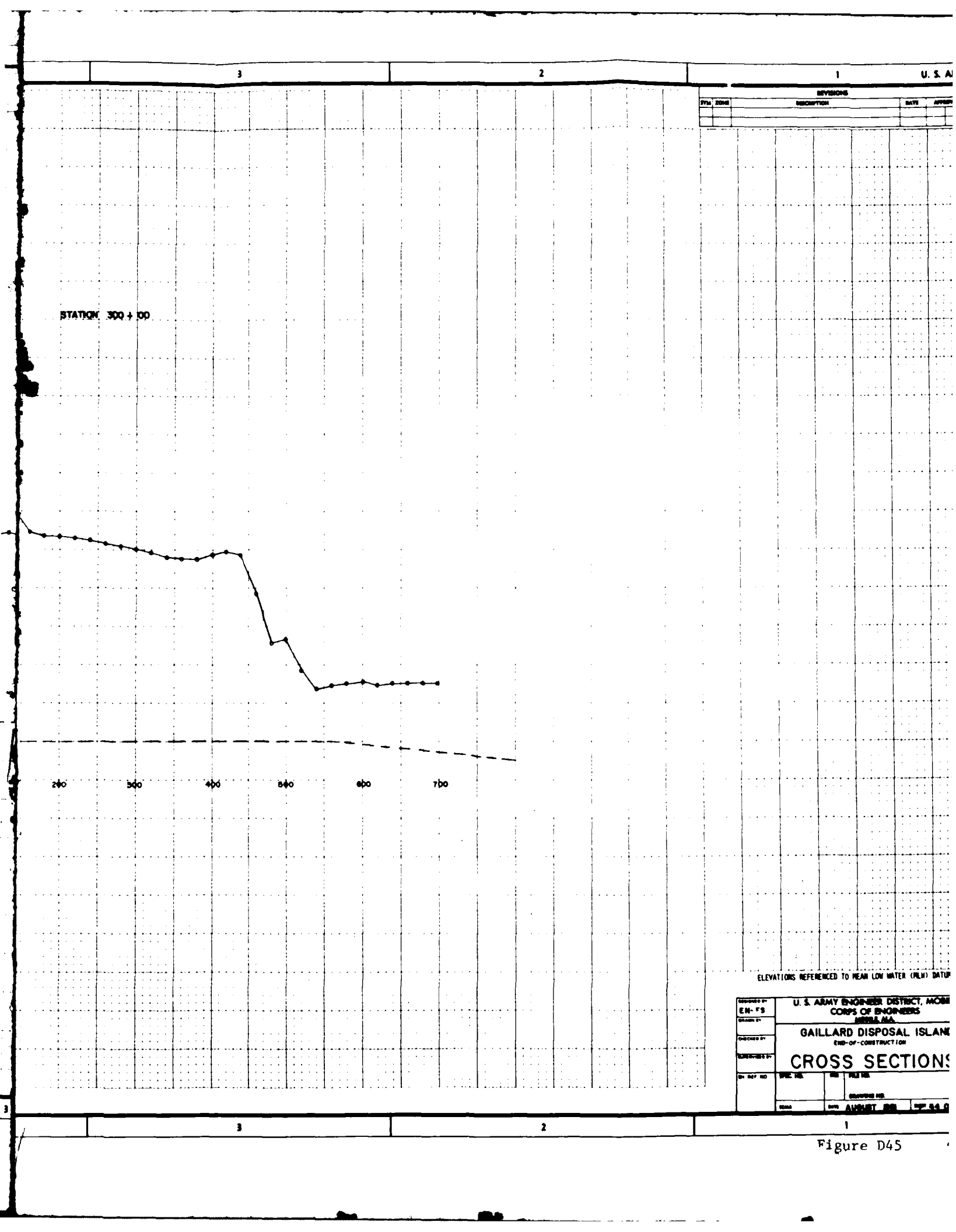
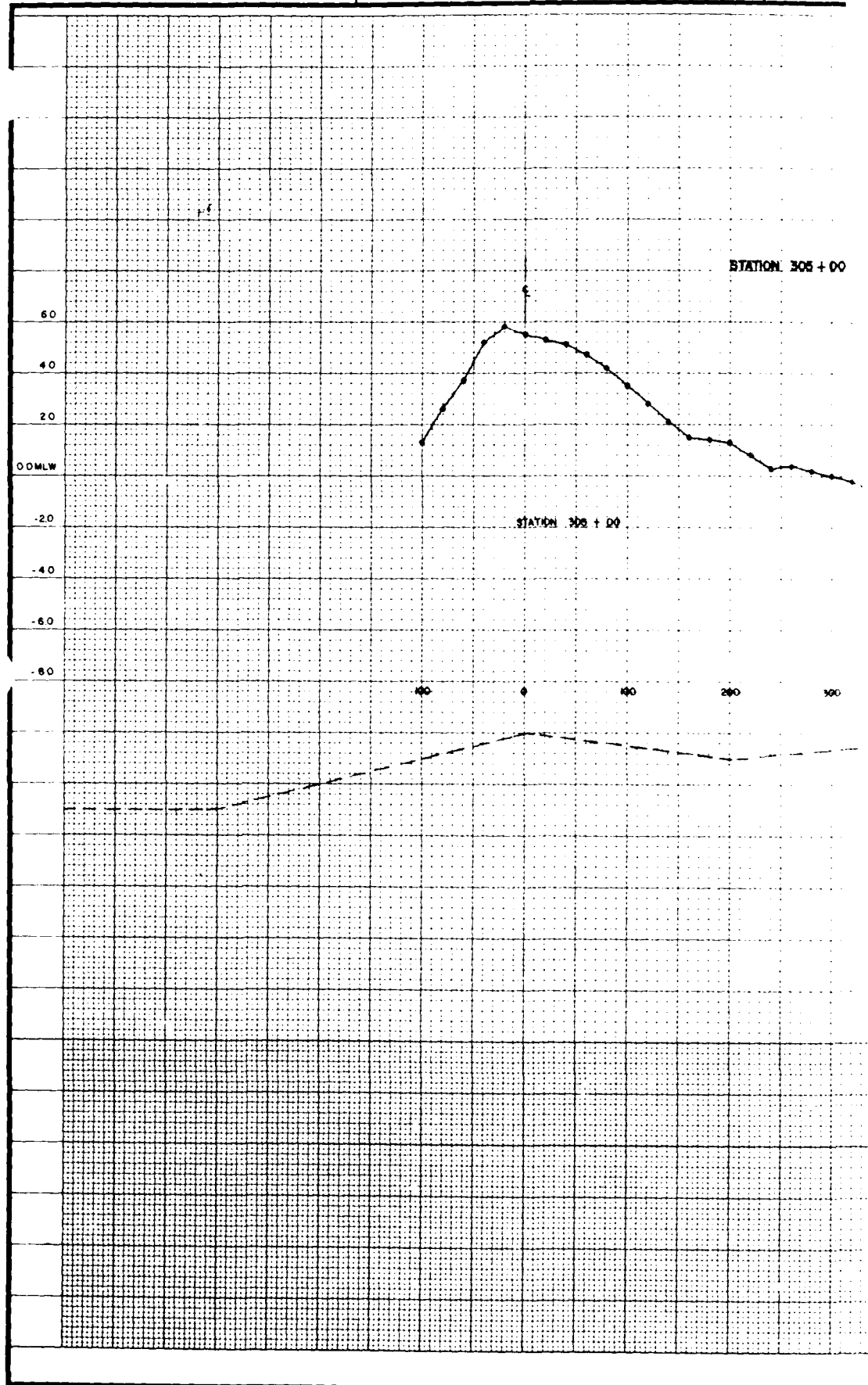


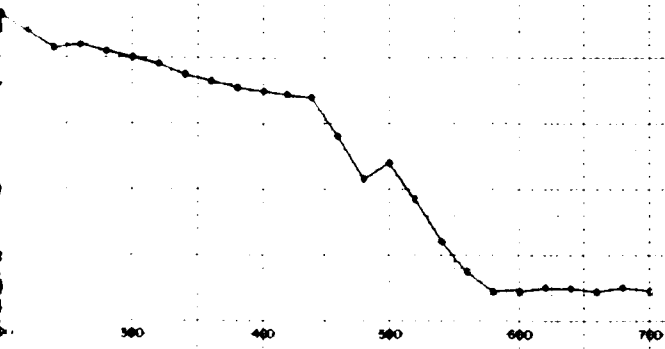
Figure D45



U. S. ARMY

REVISIONS			
SYM. ZONE	DESCRIPTION	DATE	APPROVED

STATION. 305 + 00



ELEVATIONS REFERENCED TO MEAN LOW WATER (MLW) DATUM

DESIGNED BY EN-FS	U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, ALA.		
CHECKED BY	GAILLARD DISPOSAL ISLAND END OF CONSTRUCTION		
CROSS SECTIONS			
BY REF. NO.	SPEC. NO.	DATE	FILE NO.
DRAWING NO.		SHEET 45 OF 45	
SCALE		DATE AUGUST 1981	

APPENDIX E: GAILLARD DISPOSAL ISLAND POST-CONSTRUCTION CONTOURS

1. This appendix includes 10 of 11 contour maps that were prepared after construction. The sixth contour map which included the center portion of this disposal island was not included because the materials deposited in this area were too flat and did not show much information. Figure E1 shows the contour map locations and E2 through E11 show the contour maps prepared.

TABLE OF CONTENTS

<u>Title</u>	<u>Figure</u>
Section Key Map	E1
Contours Section 1	E2
Contours Section 2	E3
Contours Section 3	E4
Contours Section 4	E5
Contours Section 5	E6
Contours Section 6	E7
Contours Section 7	E8
Contours Section 8	E9
Contours Section 9	E10
Contours Section 10	E11
Contours Section 11	E12

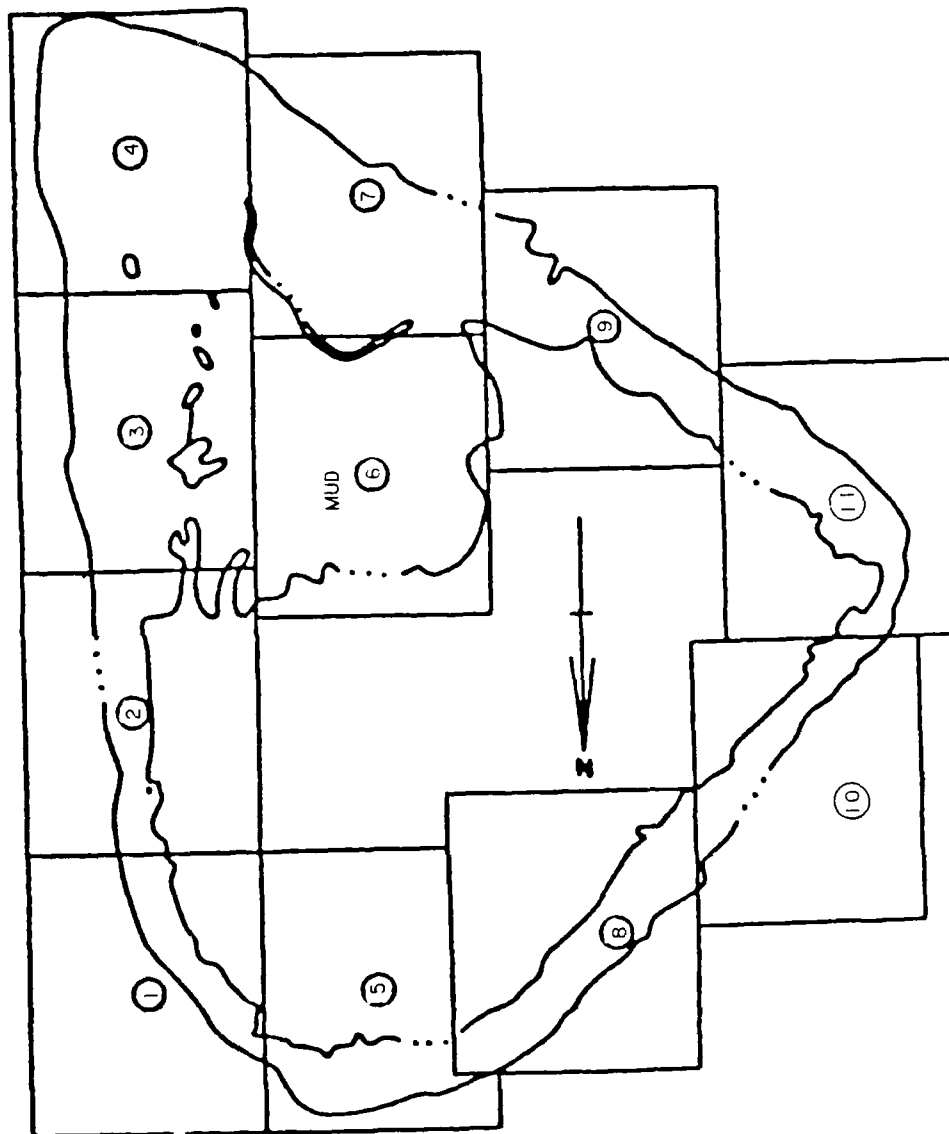


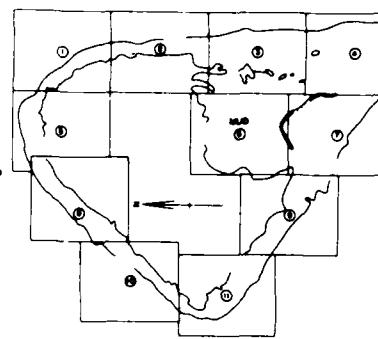
Figure E1. Key for survey contour maps for Figures E2 through E11

CORPS OF ENGINEERS

4



REVISIONS		
NO.	DATE	DESCRIPTION



KEY MAP
SCALE 1:5000

LEGEND

- TREATMENT BASIN
- △ SHALLOW POOL MONUMENT
- DEEP DECONTAMINATION MONUMENT
- 14.2 SPOT ELEVATION
- HIGHER CONTOUR
- INTERMEDIATE CONTOUR
- WATER'S EDGE

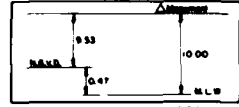
TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD.
FROM AERIAL PHOTOGRAPHY DATED 15 OCT 68

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM, NAD 83

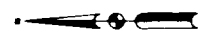
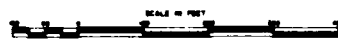
VERTICAL DATUM IS MEAN LOW WATER
CONTOUR INTERVAL, 0.1 FOOT

CONVERSION FROM MEAN LOW WATER TO NAVD 83 (FORMERLY M.S.L.) DATUM
MSL - M.L.W. 0.47

EXAMPLE



NGVD NATIONAL GEODETIC VERTICAL DATUM



MOBILE HARBOR, ALABAMA
**GAILLARD
DISPOSAL ISLAND**
CONTOURS-POST CONSTRUCTION
Contour Map 1

CORPS OF ENGINEERS

4

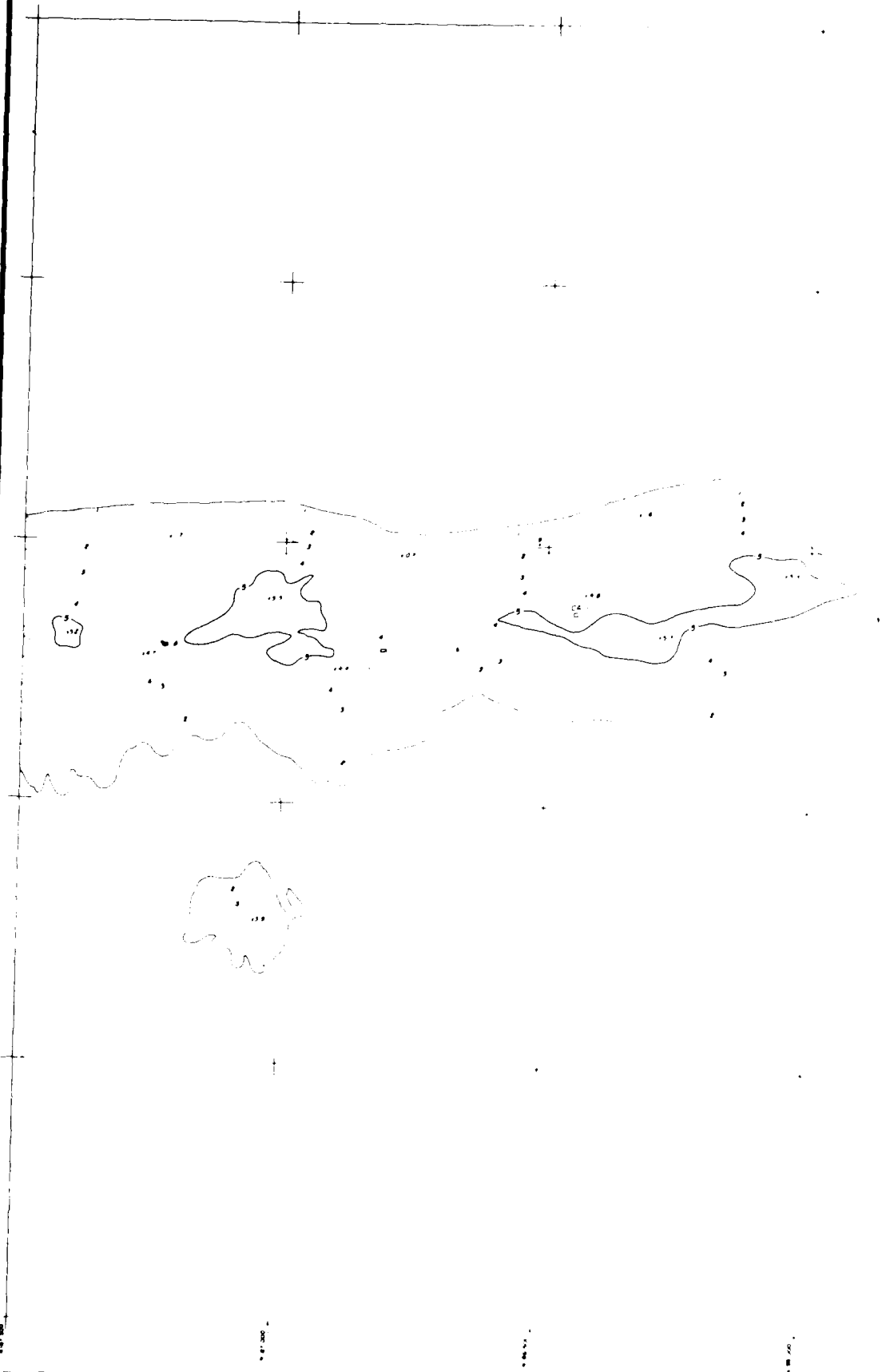
E

D

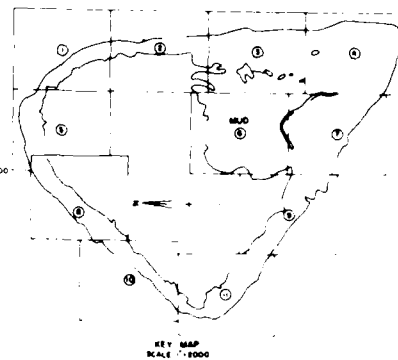
C

B

A



REVISIONS			
BY	HOW	DESCRIPTION	DATE



LEGEND

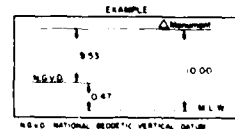
- ① TREATMENT HUB
- △ DEEP MONUMENT
- SEDIMENTATION MONUMENT
- 44.5 SPOT ELEVATION
- ROBEY CONTOUR
- INTERMEDIATE CONTOUR
- WATER'S EDGE

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS
FROM AERIAL PHOTOGRAPHY DATED 19 OCT 1961

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM WEST ZONE

VERTICAL DATUM IS MEAN LOW WATER
CONTOUR INTERVAL IS 1 FOOT

CONVERSION FROM MEAN LOW WATER TO NGVD DATUM
NGVD MEAN LOW WATER



SCALE IN FEET

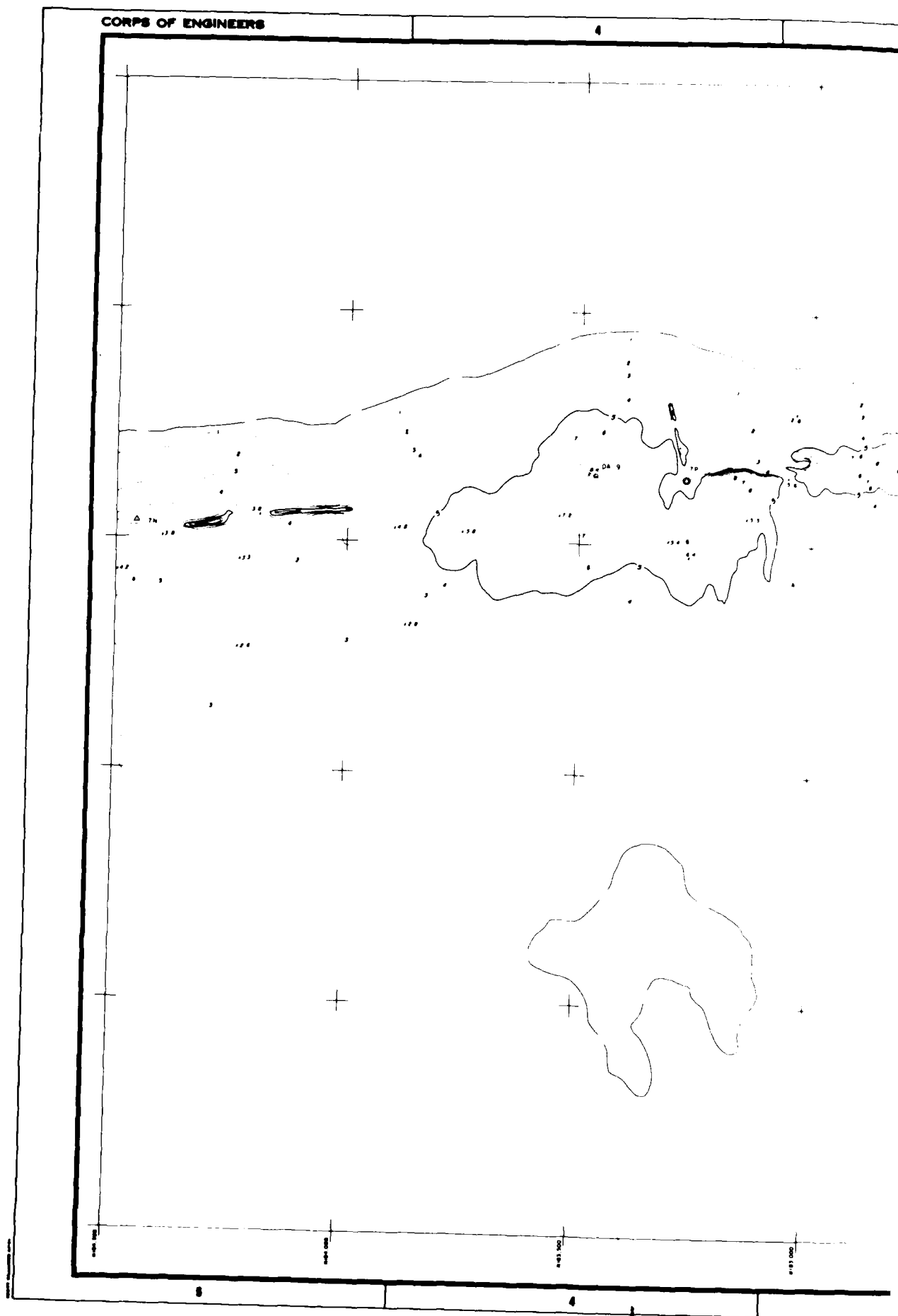
MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

CONTOUR MAP
Contour Map 2

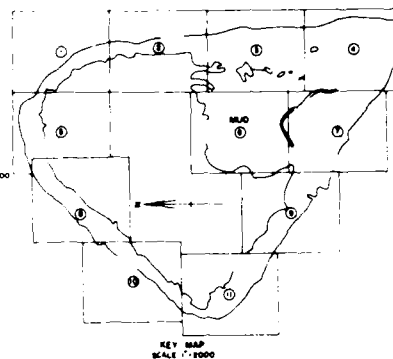
CORPS OF ENGINEERS

4



REVISIONS

SYMBOL	FORM	DESCRIPTION	DATE	APPROVED



LEGEND

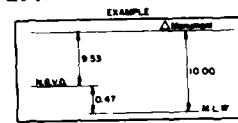
- THREATENED HAB
- △ SHIP-DEEP ROO MONUMENT
- SEDIMENTATION MONUMENT
- #4.3 SPOT ELEVATION
- HIGHER CONTOUR
- INTERMEDIATE CONTOUR
- WATER'S EDGE

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS,
FROM AERIAL PHOTOGRAPHY DATED 19 OCT 1964

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM WEST ZONE

VERTICAL DATUM IS MEAN LOW WATER
CONTOUR INTERVAL IS 1 FOOT

CONVERSION FROM MEAN LOW WATER TO NAVD FORMERLY M.S.L. 1929 DATUM
M.L.W. - M.S.L. 0.47

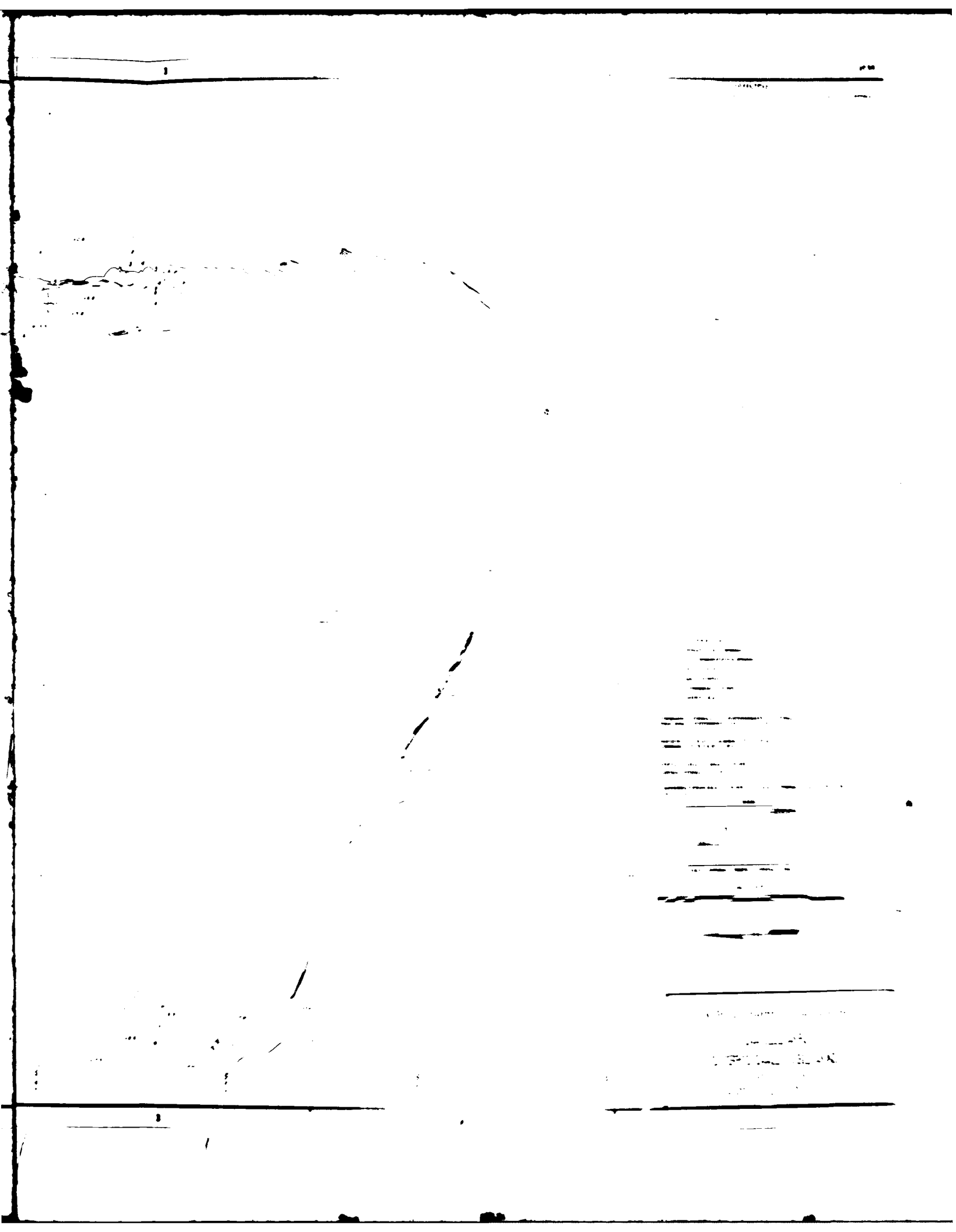


MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLANDCONTOURS-POST CONSTRUCTION
Contour Map 3

Figure E4

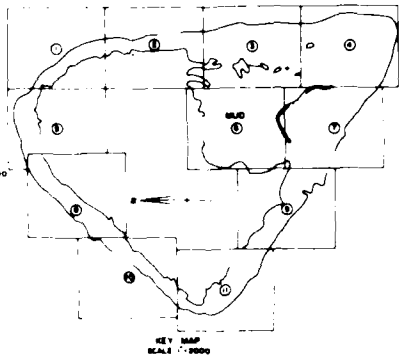






MATCH TO SHEET 8 OF 11

REVISIONS				
DATE	BY	DESCRIPTION	DATE	APPROVED



LEGEND

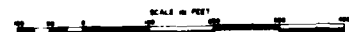
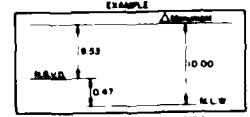
- TREATMENT HUB
- ▲ SPILL-DEEP AND MONUMENT
- SEDIMENTATION MONUMENT
- SPOT ELEVATION
- HIGHER CONTOUR
- - - INTERMEDIATE CONTOUR
- WATER'S EDGE

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD.
FROM AERIAL PHOTOGRAPHY DATED 10 OCT 1954

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM, WEST ZONE

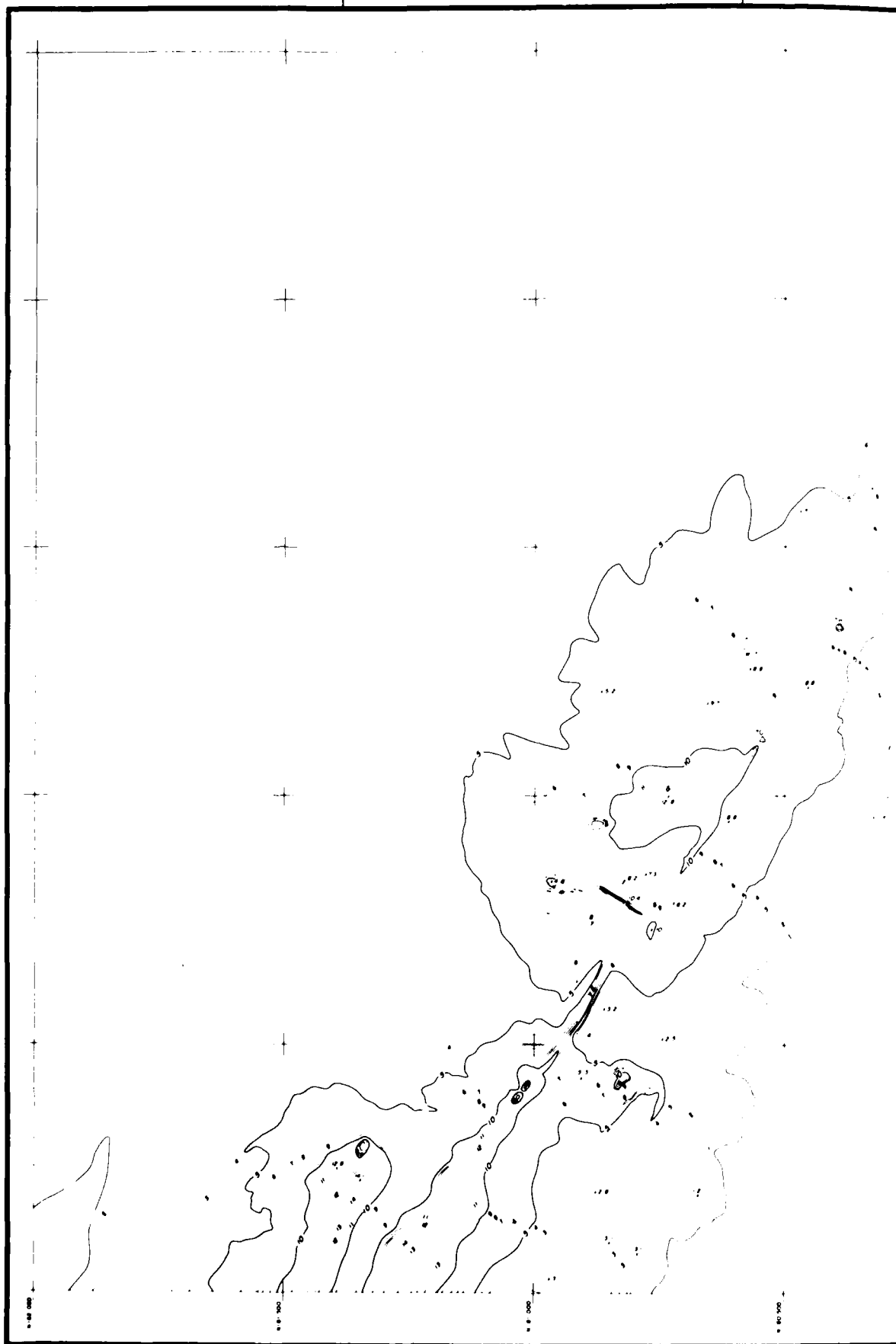
VERTICAL DATUM IS MEAN LOW WATER
CONTOUR INTERVAL IS 1 FOOT

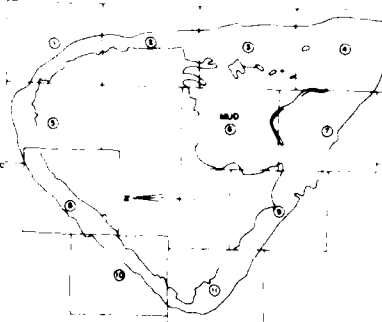
CONVERSION FROM MEAN LOW WATER TO MEAN SPHERICAL M.S.L. SEE DATUM
M.S.L. - M.L.W. 0.47



MOBILE HARBOR, ALABAMA
**GAILLARD
DISPOSAL ISLAND**
CONTOURS-POST CONSTRUCTION
Contour Map 5

Figure E6





KEY MAP
SCALE 1" = 2000'

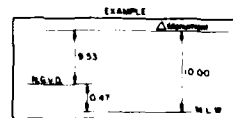
0 TH-TREATED MUD
 Δ SPR-DEEP ROO MONUMENT
 ● SED-REDENSIFICATION MONUMENT
 243 SPOT ELEVATION
 5 INDEX CONTOUR
 3 - INTERMEDIATE CONTOUR
 - WATER'S EDGE

TOPOGRAPHY CORRELATED BY PHOTOGRAMMETRIC METHOD,
FROM AERIAL PHOTOGRAPHY DATED 15 OCT 1961.

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM, WEST ZONE

VERTICAL DATUM IS MEAN LOW WATER
CONTOUR INTERVAL IS 1 FOOT

CONVERSION FROM MEAN LOW WATER TO NSVD (FORMERLY MSL) DATUM
NSVD - MLLW 0.47



MSVD NATIONAL GEODETIC VERTICAL DATUM

SCALE IN FIG. 1



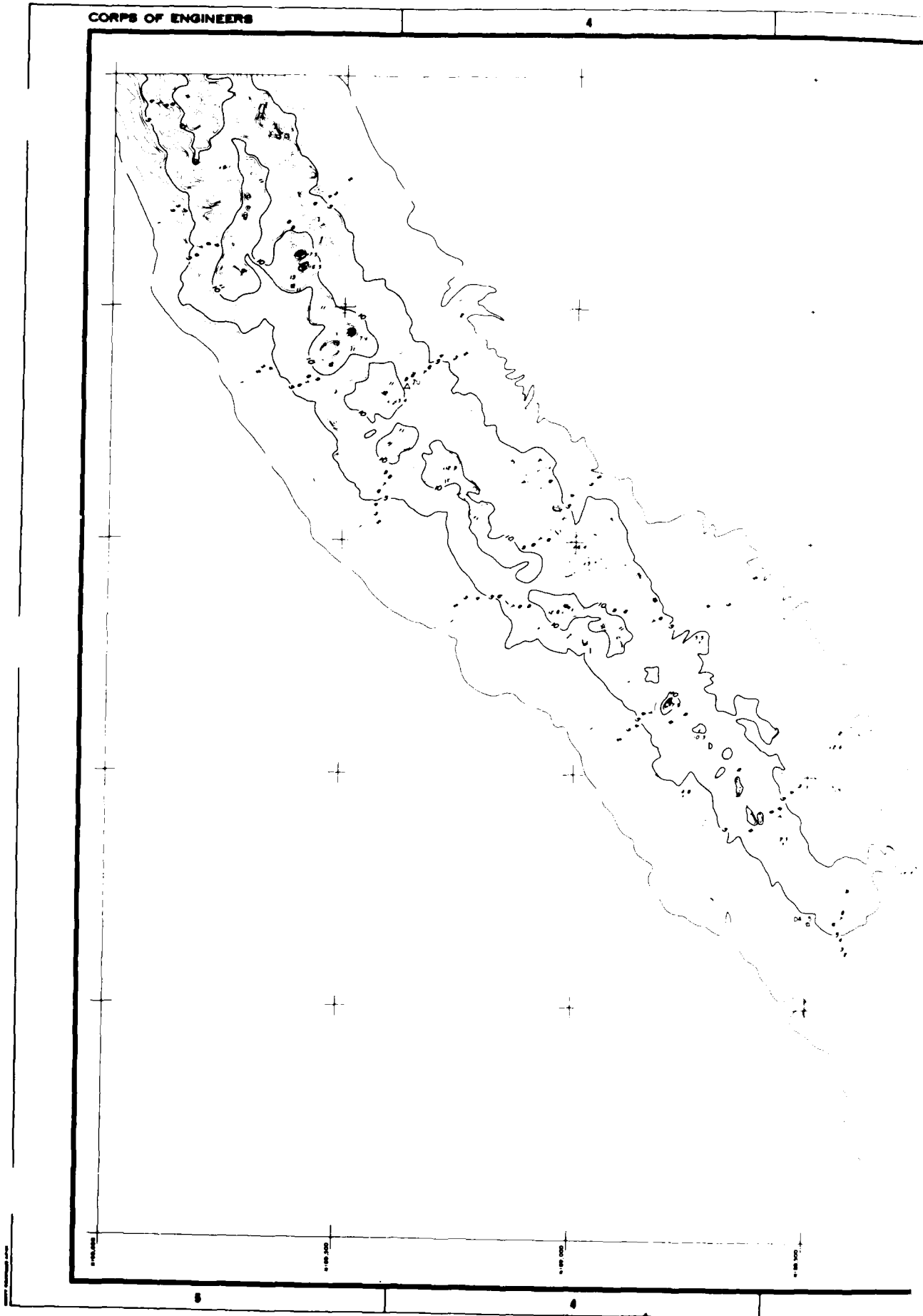
MOBILE HARBOR, ALABAMA

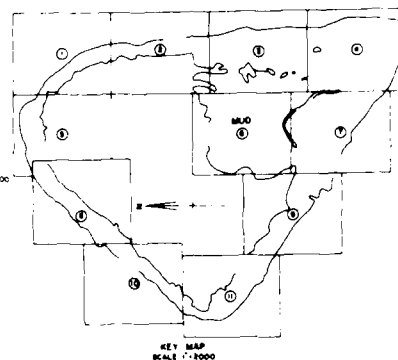
GAILLARD

DISPOSAL ISLAND

CONTOURS POST CONSTRUCTION
Contour Map 7

Figure E7





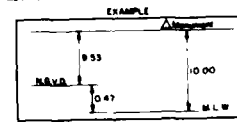
● THIN-TREATED HUB
 ▲ DEEP DEEP AND MONUMENT
 ⊙ DEEP DEEP MONUMENT
 x x x SPOT ELEVATION
 — 5 — HIDEY CONTOUR
 — 3 — INTERMEDIATE CONTOUR
 — — WATER'S EDGE

TOPOGRAPHY COMPILED BY PHOTOSTEREOTIC METHOD.
FROM AERIAL PHOTOGRAPHY DATED 19 OCT 1951

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM NAD 83 ZONE

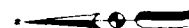
VERTICAL DATUM IS MEAN LOW WATER
CONTINUOUS INTERVAL IS 1 FOOT

CONVERSION FROM MEAN LOW WATER TO MGD FORMERLY M.S.L. 1929 DATUM
MGD - M.S.L. - 0.47



U.S. NATIONAL SECURITY VERTICAL DATUM

SCALE IN PTE



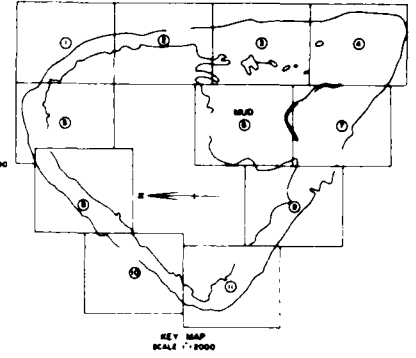
GAILLARD
DISPOSAL ISLAND

CONTOURS-POST CONSTRUCTION
Contour Map 8

Figure E8



REVISIONS			
REV	DATE	DESCRIPTION	APPROVED



LEGEND

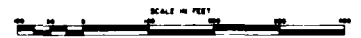
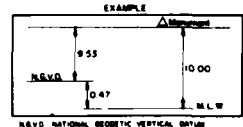
- THREAT HUB
- △ DEEP ROD MONUMENT
- ① BED SEDIMENTATION MONUMENT
- SPOT ELEVATION
- INDEX CONTOUR
- INTERMEDIATE CONTOUR
- WATER'S EDGE

TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD
FROM AERIAL PHOTOGRAPHY DATED 15 OCT 1958

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM, WEST ZONE

VERTICAL DATUM IS MEAN LOW WATER
CONTOUR INTERVAL IS 1 FOOT

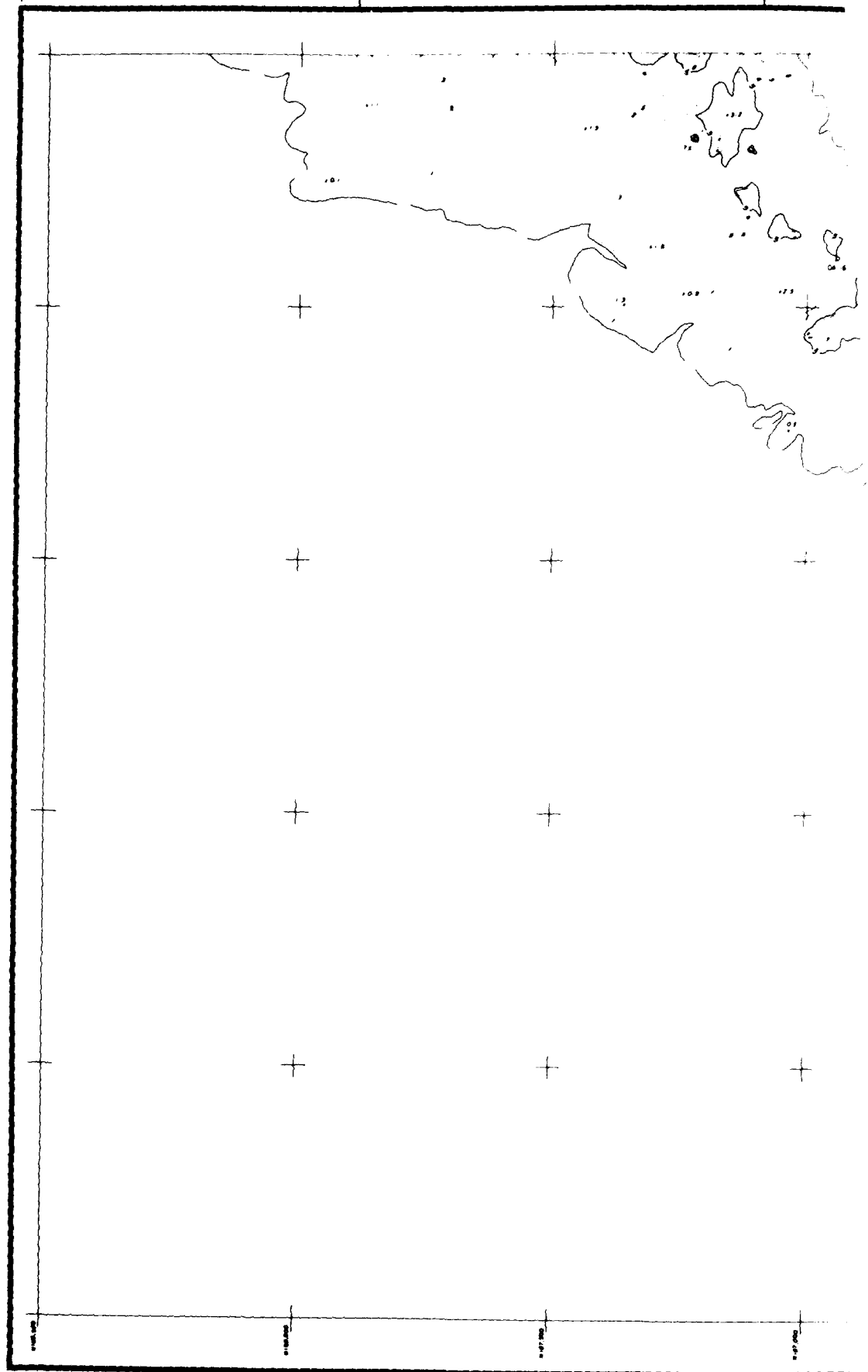
CONVERSION FROM MEAN LOW WATER TO NGVD FORMERLY M.S.L. 1929 DATUM
NGVD-M.L.W. 0.47



MOBILE HARBOR, ALABAMA
**GAILLARD
DISPOSAL ISLAND**
CONTOURS-POST CONSTRUCTION
Contour Map 9

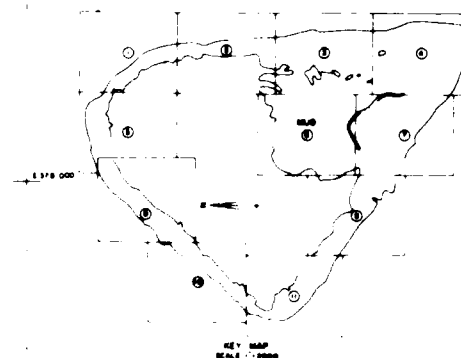
Figure E9

CORPS OF ENGINEERS



REVISIONS

DATE	FOR	DESCRIPTION	DATE	APPROVED



LEGEND

- TREATED HUB
- ▲ DEEP ROD MONUMENT
- DEEP SEIMENTATION MONUMENT
- 4.2 SPOT ELEVATION
- HIGHER CONTOUR
- INTERMEDIATE CONTOUR
- WATER'S EDGE

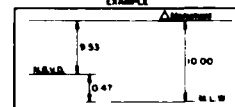
TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHOD
FROM AERIAL PHOTOGRAPH DATED 10 OCT 1950

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM, NAD 83

VERTICAL DATUM IS MEAN LOW WATER
CONTOUR INTERVAL IS 1 FOOT

CONVERSION FROM MEAN LOW WATER TO NAVS (NAD 83) DATUM
NAVS - MLLW = 0.47

EXAMPLE



NAVS DATUM, GEODETIC VERTICAL DATUM

SCALE IN FEET

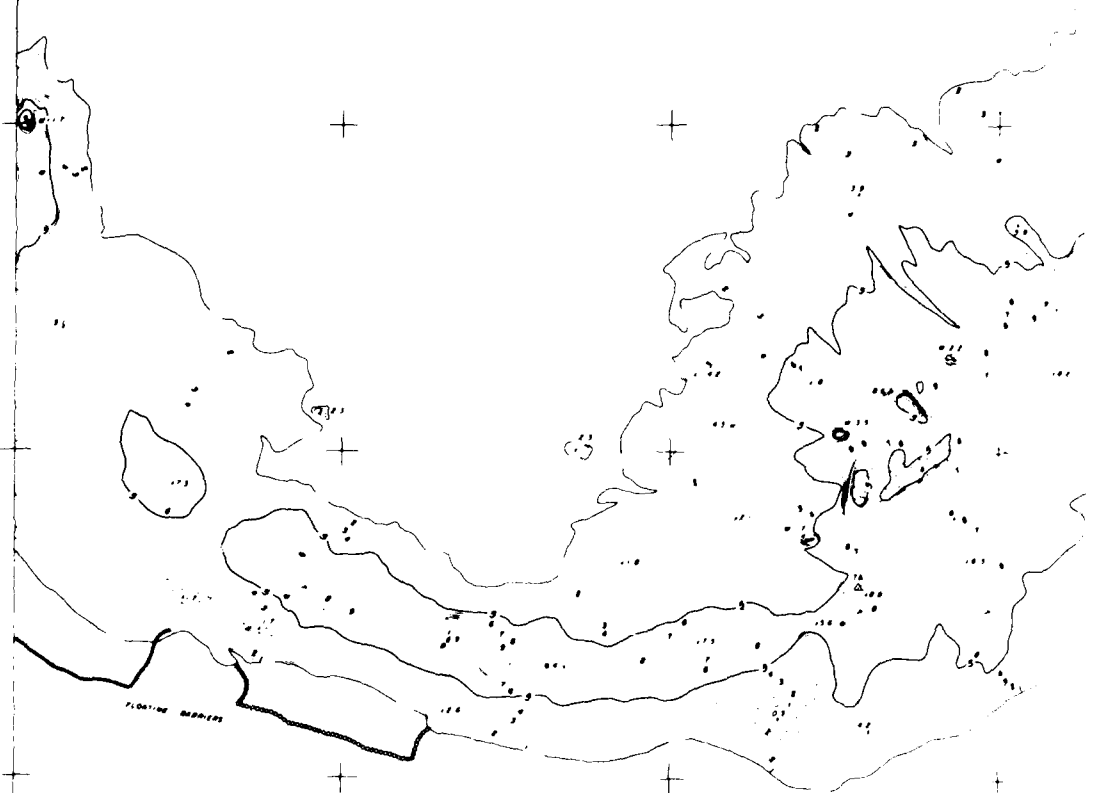


MOBILE HARBOR, ALABAMA

**GAILLARD
DISPOSAL ISLAND**

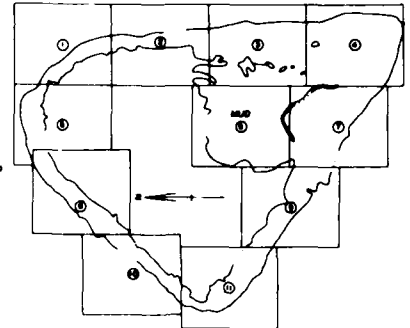
CONTOURS-POST CONSTRUCTION
Contour Map 10

Figure E10



REVISIONS

NO.	DATE	DESCRIPTION	DATE	APPROVED

KEY MAP
SCALE 1"=1000'

LEGEND

- THREATENED HARBOR
- ▲ SPOT-DEEP ROD MONUMENT
- SEDIMENTATION MONUMENT
- 4.2 SPOT ELEVATION
- HIGHER CONTOUR
- INTERMEDIATE CONTOUR
- WATER'S EDGE

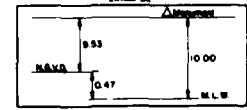
TOPOGRAPHY COMPILED BY PHOTOGRAMMETRIC METHODS
FROM AERIAL PHOTOGRAPHY DATED 19 OCT 1961

HORIZONTAL DATUM IS ALABAMA STATE PLANE
COORDINATE SYSTEM, WEST ZONE

VERTICAL DATUM IS MEAN LOW WATER
CONTOUR INTERVAL IS 1 FOOT

CONVERSION FROM MEAN LOW WATER TO NAVD (FORMERLY MLLW) DATA
NAVD - MLLW - 0.47

EXAMPLE



NAVD NATIONAL GEODETIC VERTICAL DATUM

SCALE IN FEET



MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

CONTOURS-POST CONSTRUCTION

Contour Map 11

Figure E11

APPENDIX F: GAILLARD DISPOSAL ISLAND SETTLEMENT DATA

1. This appendix includes chronological subsidence data from 12 settlement monuments which can be located in Figure F1 and plotted in Figures F2 through F13. These data were collected from settlement monuments installed after construction was completed.

TABLE OF CONTENTS

<u>Title</u>	<u>Figure</u>
Cross Section Location Map	F1
Settlement at STA 8+06.88 21A-7B	F2
Settlement at STA 28+47.59 21A-7D	F3
Settlement at STA 54+49.97 21A-7F	F4
Settlement at STA 77+44.13 21A-7H	F5
Settlement at STA 111+27.98 21A-7K	F6
Settlement at STA 138+38.40 21A-7M	F7
Settlement at STA 158+25.46 21A-7P	F8
Settlement at STA 202+51.21 21A-7R	F9
Settlement at STA 233+67.95 21A-7T	F10
Settlement at STA 253+40.21 21A-7V	F11
Settlement at STA 283+99.24 21A-7X	F12
Settlement at STA 298+23.99 21A-7Z	F13

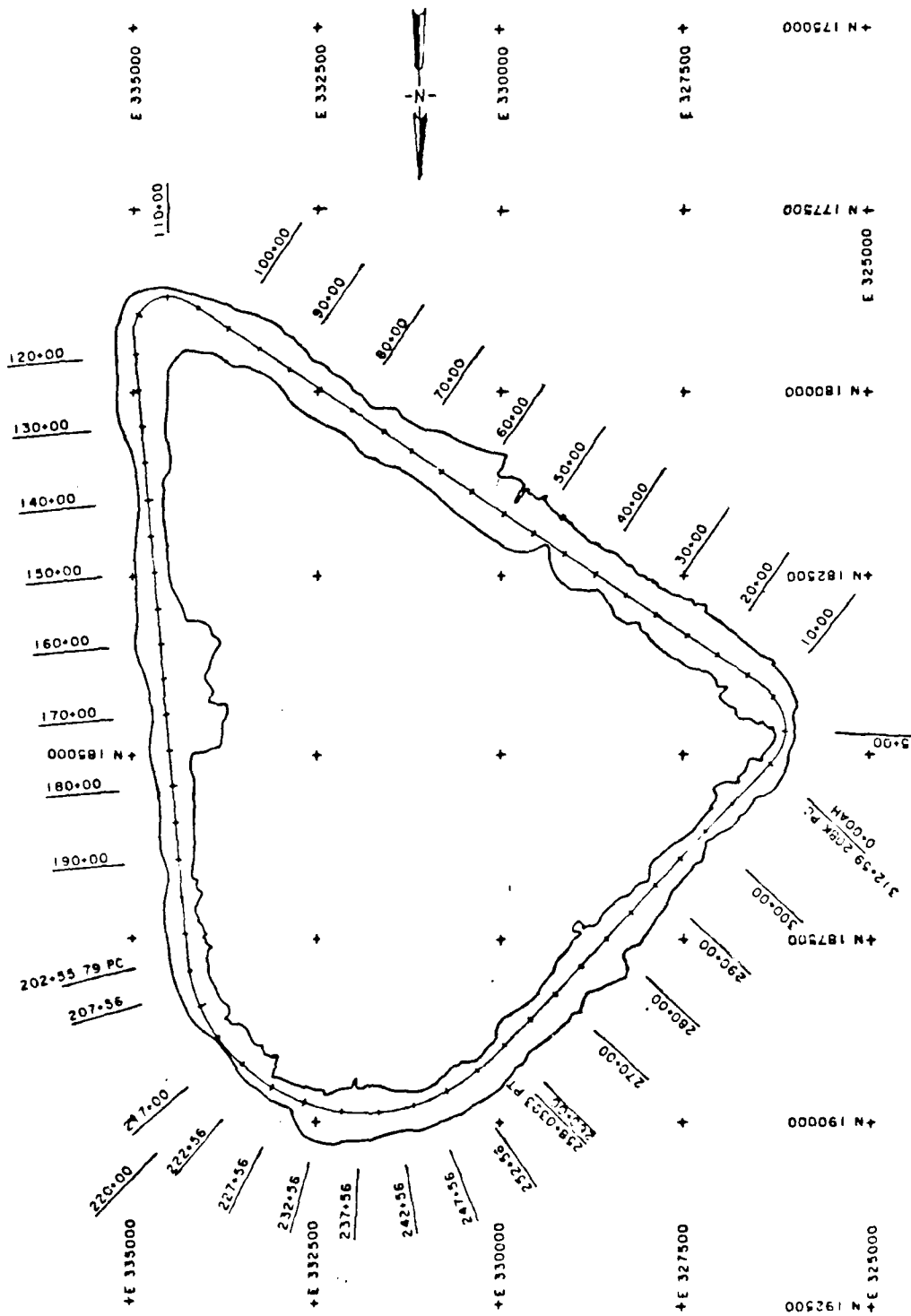
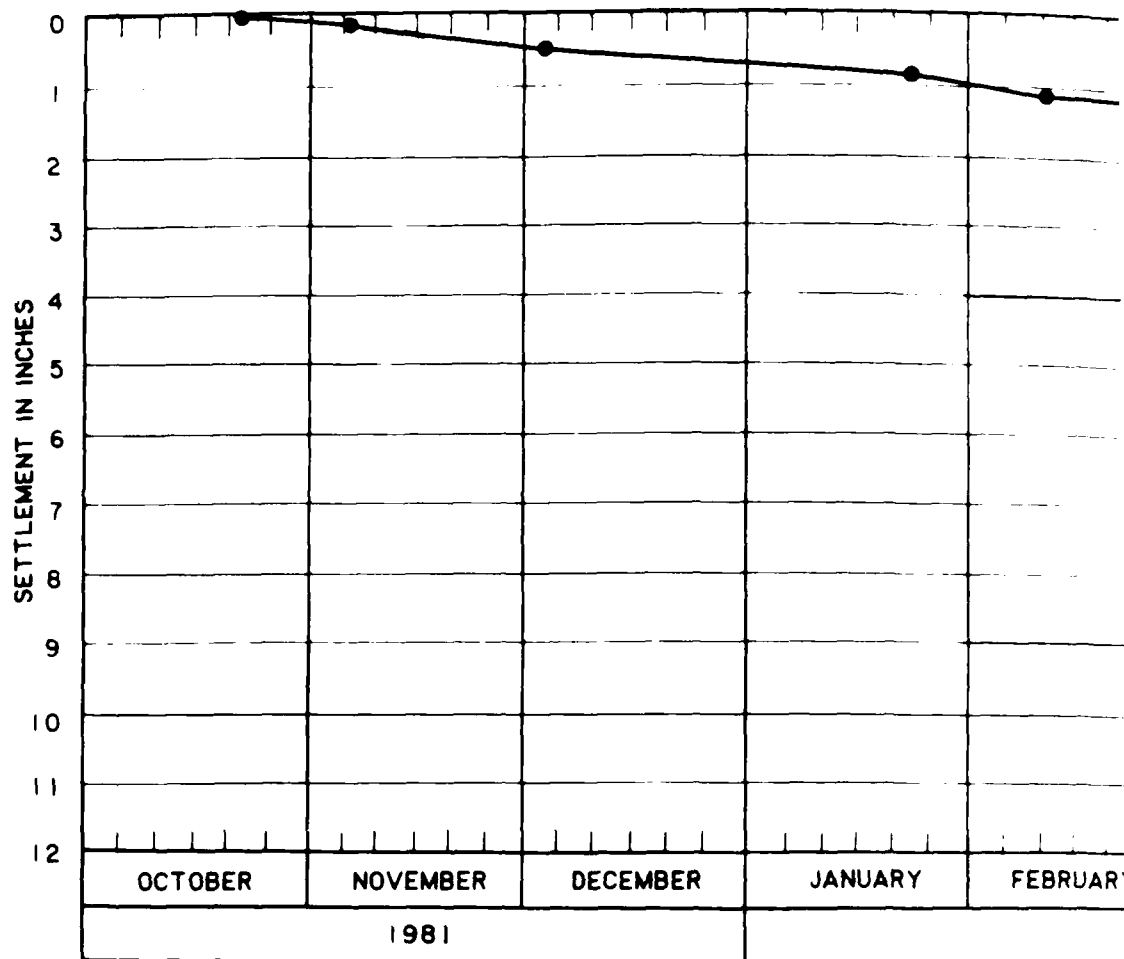
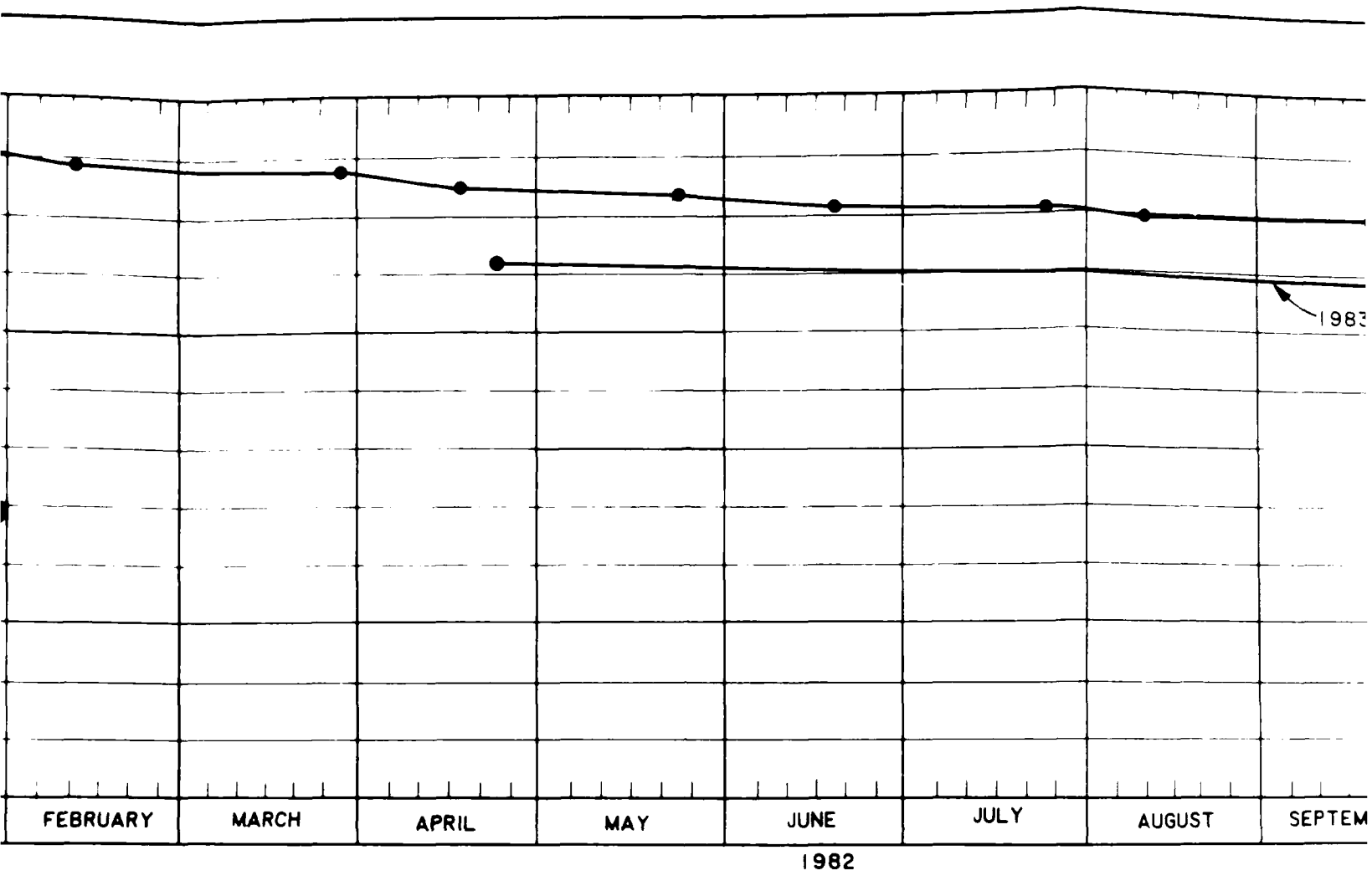
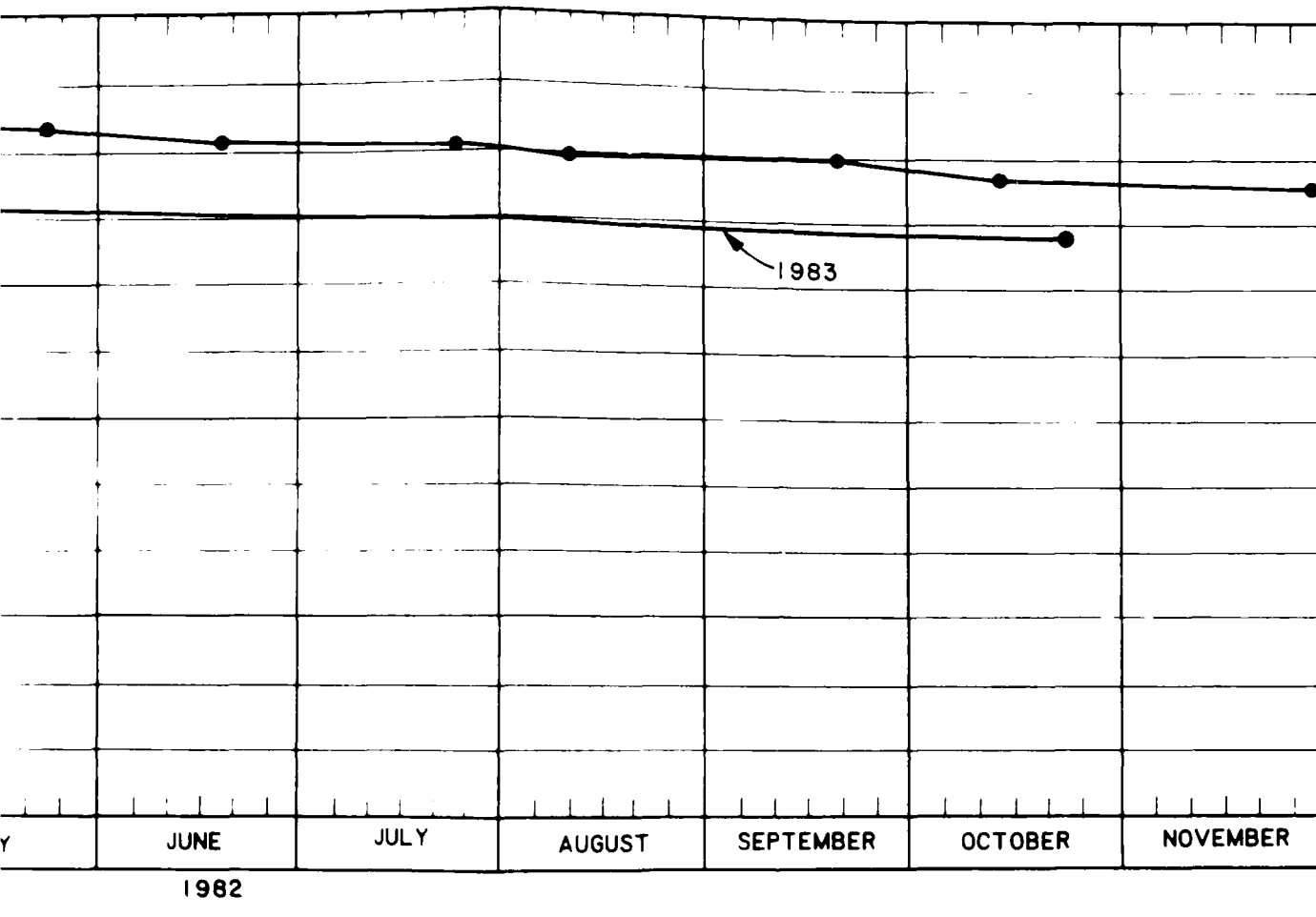


Figure F1. Location map for instrumentation for Figures F2 through F13





STATION 8+06.88 21A-7B



A-7B

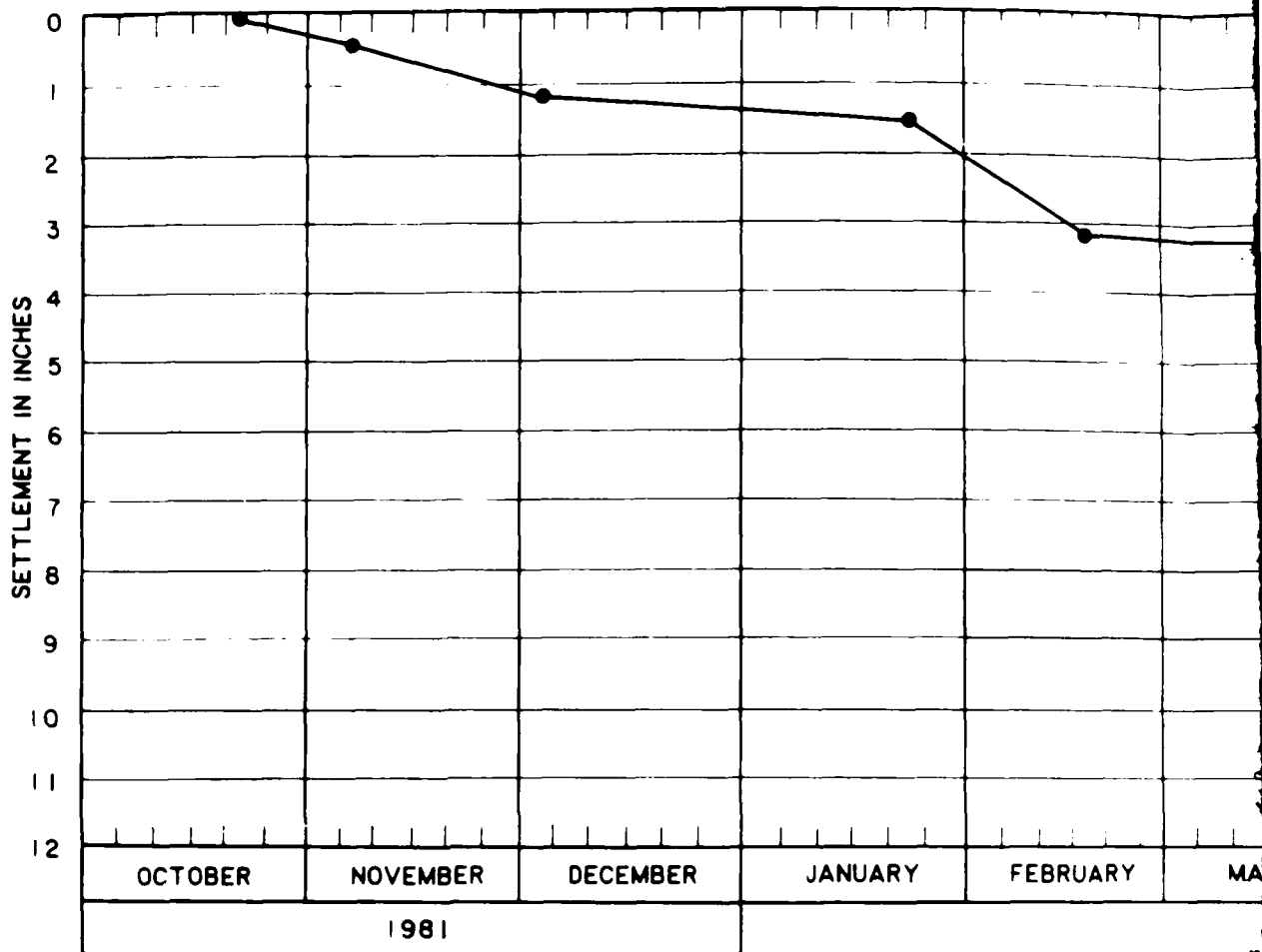
MOBILE HARBOR, ALABAMA

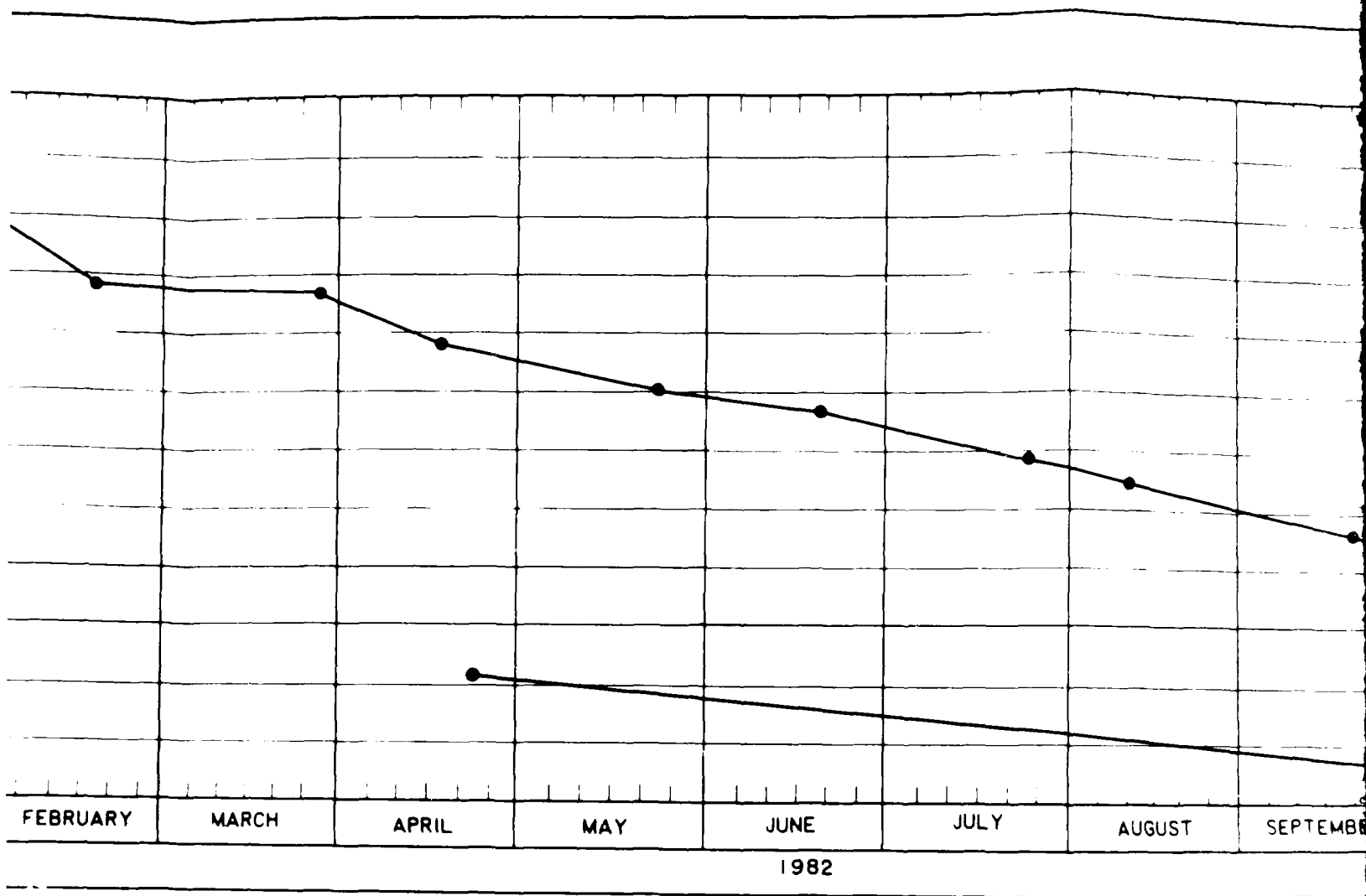
GAILLARD
DISPOSAL ISLAND

SETTLEMENT DATA

Figure F2

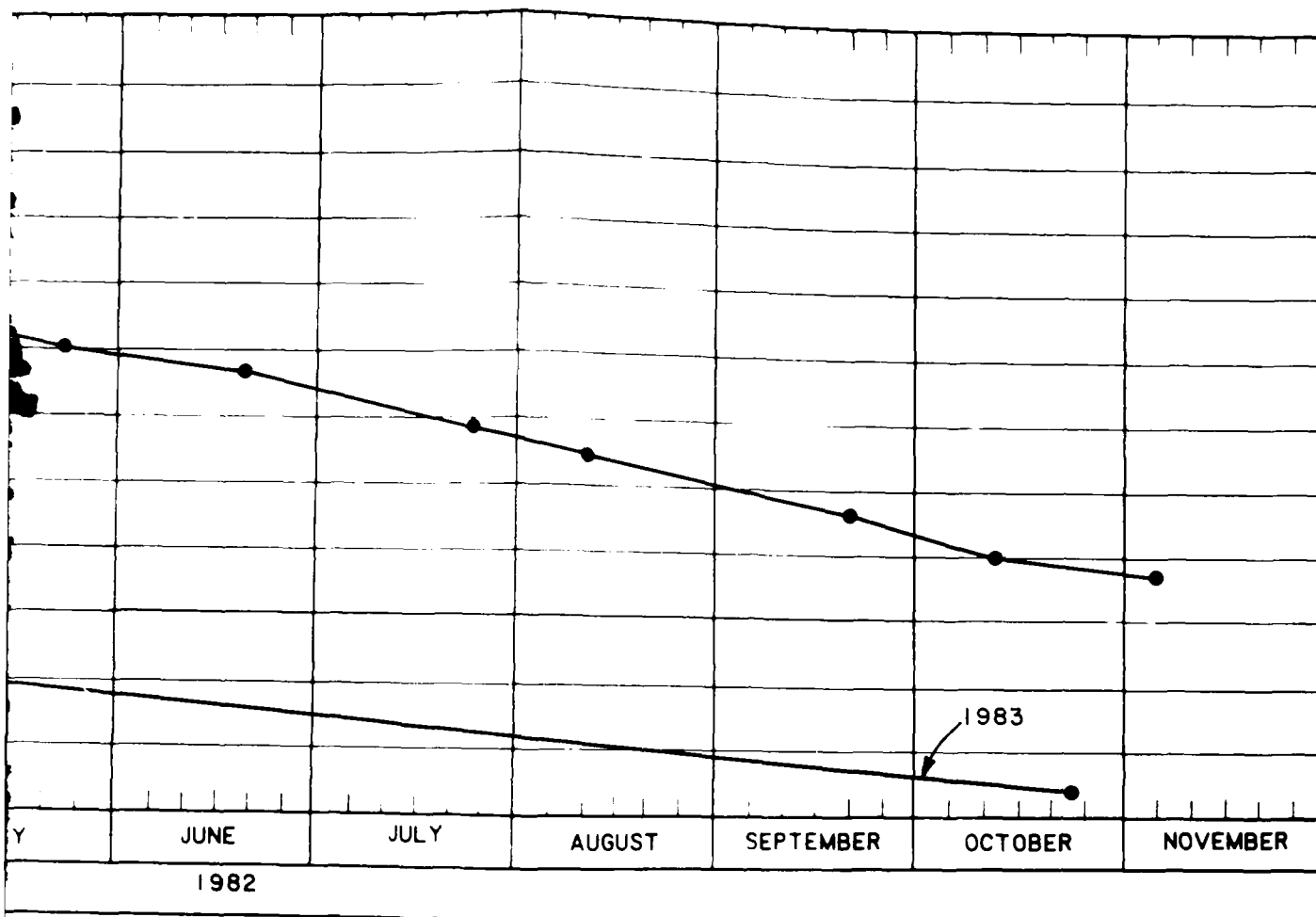
3





STATION 28+47.59 21A-7D

M



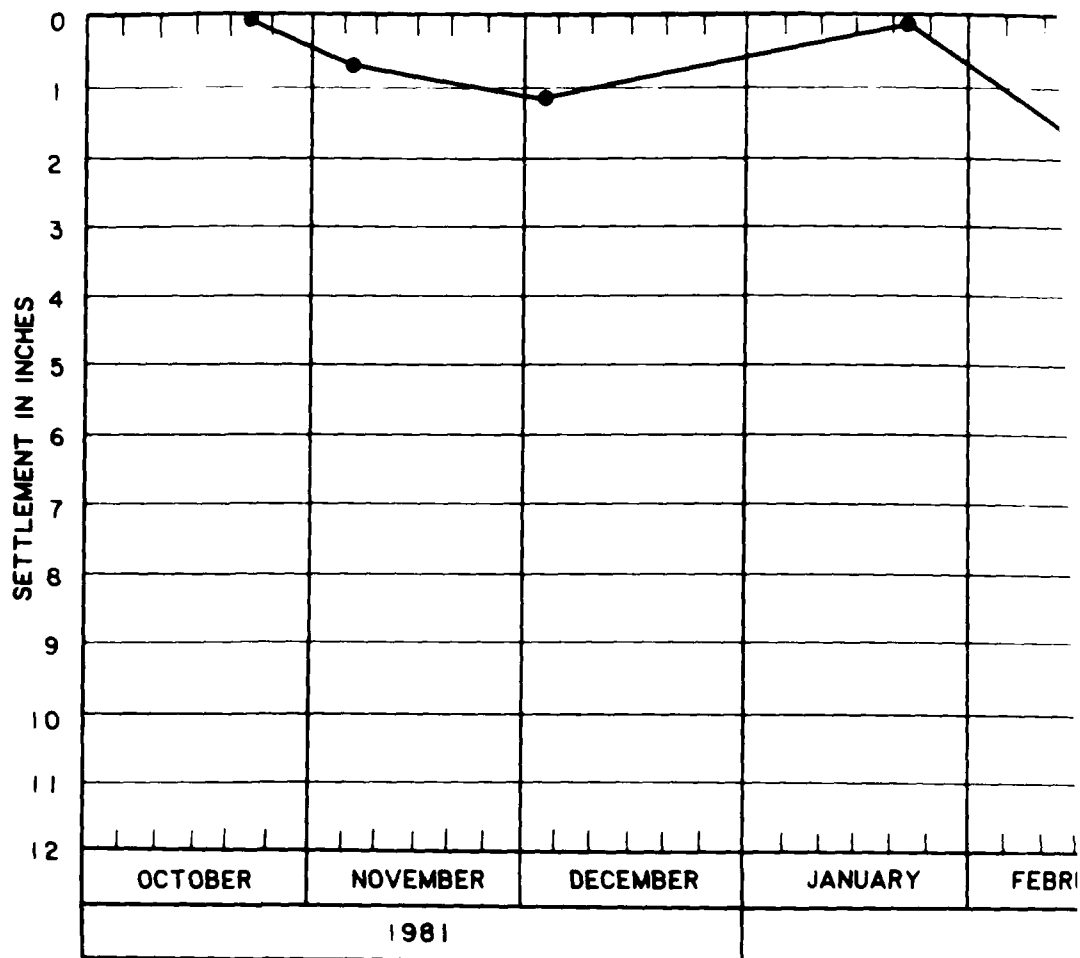
21A-7D

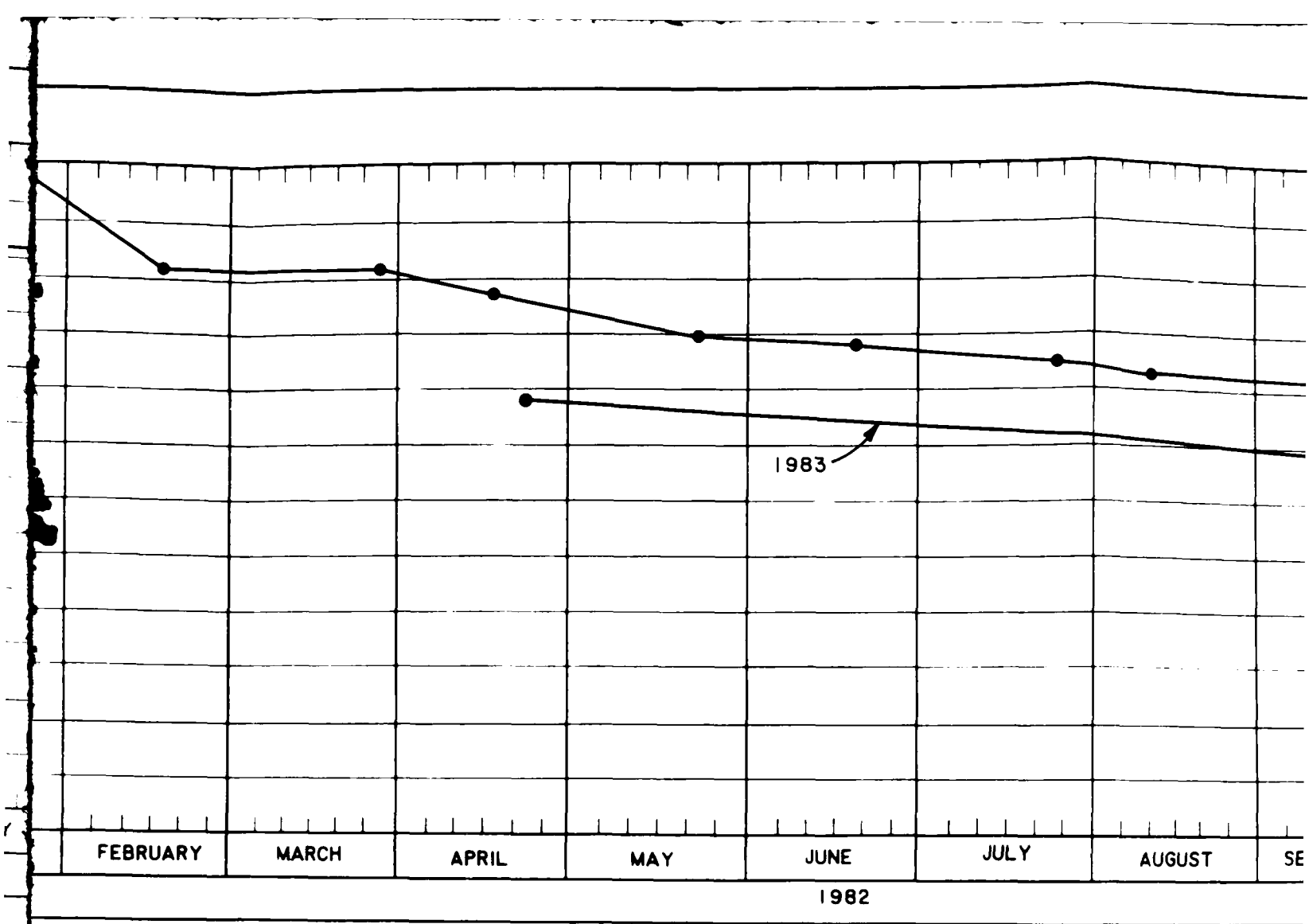
MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

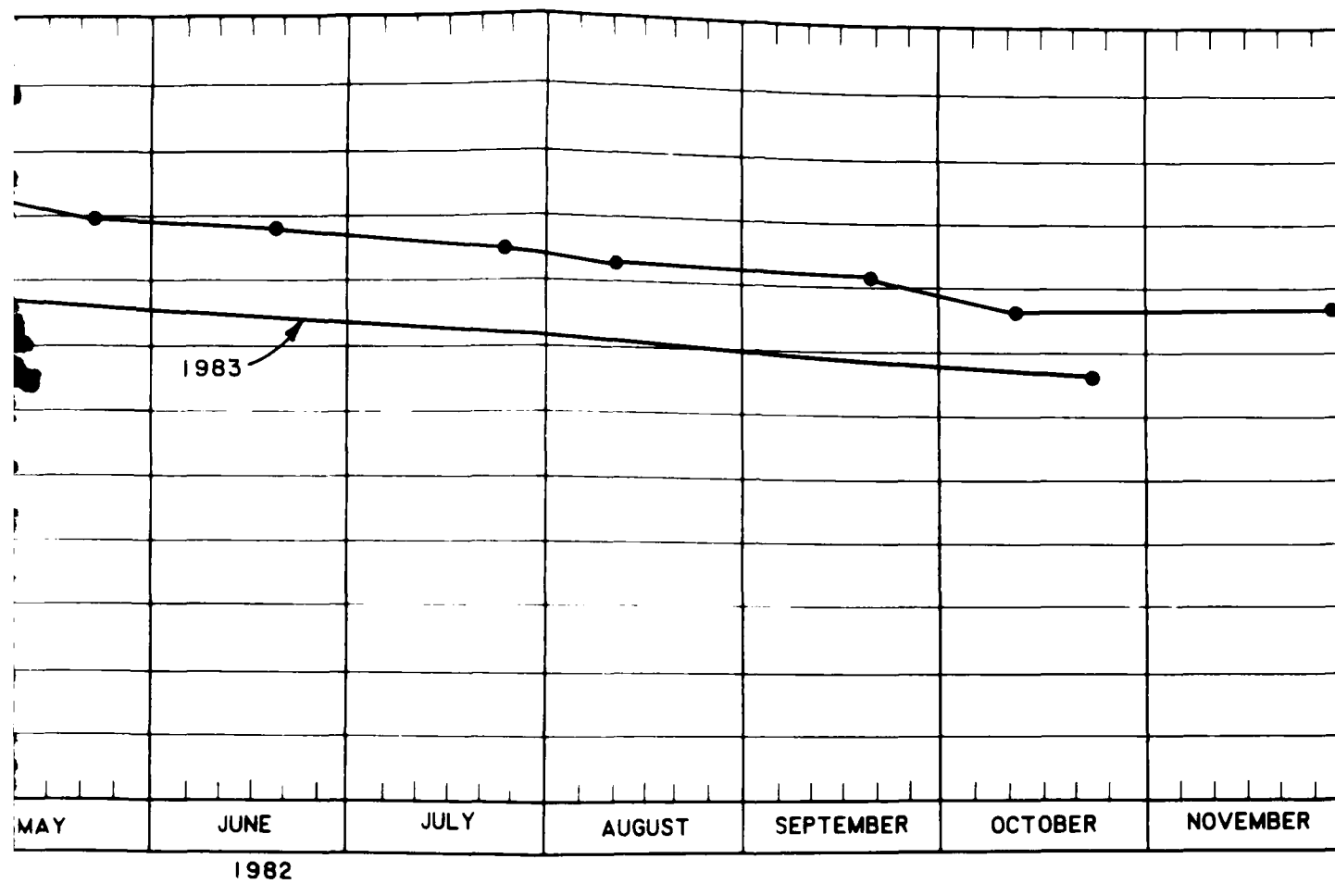
SETTLEMENT DATA

Figure F3





STATION 54+49.97 21A-7F



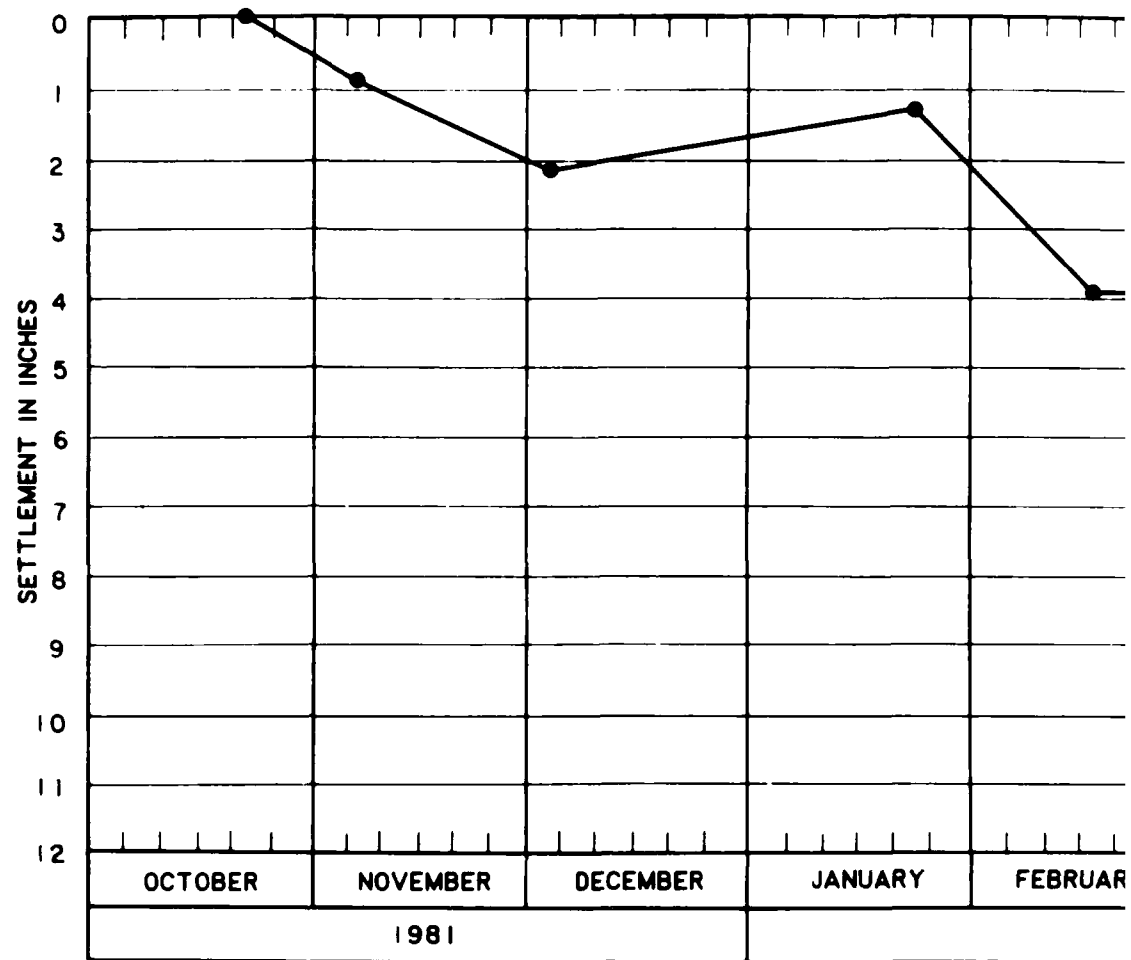
21A-7F

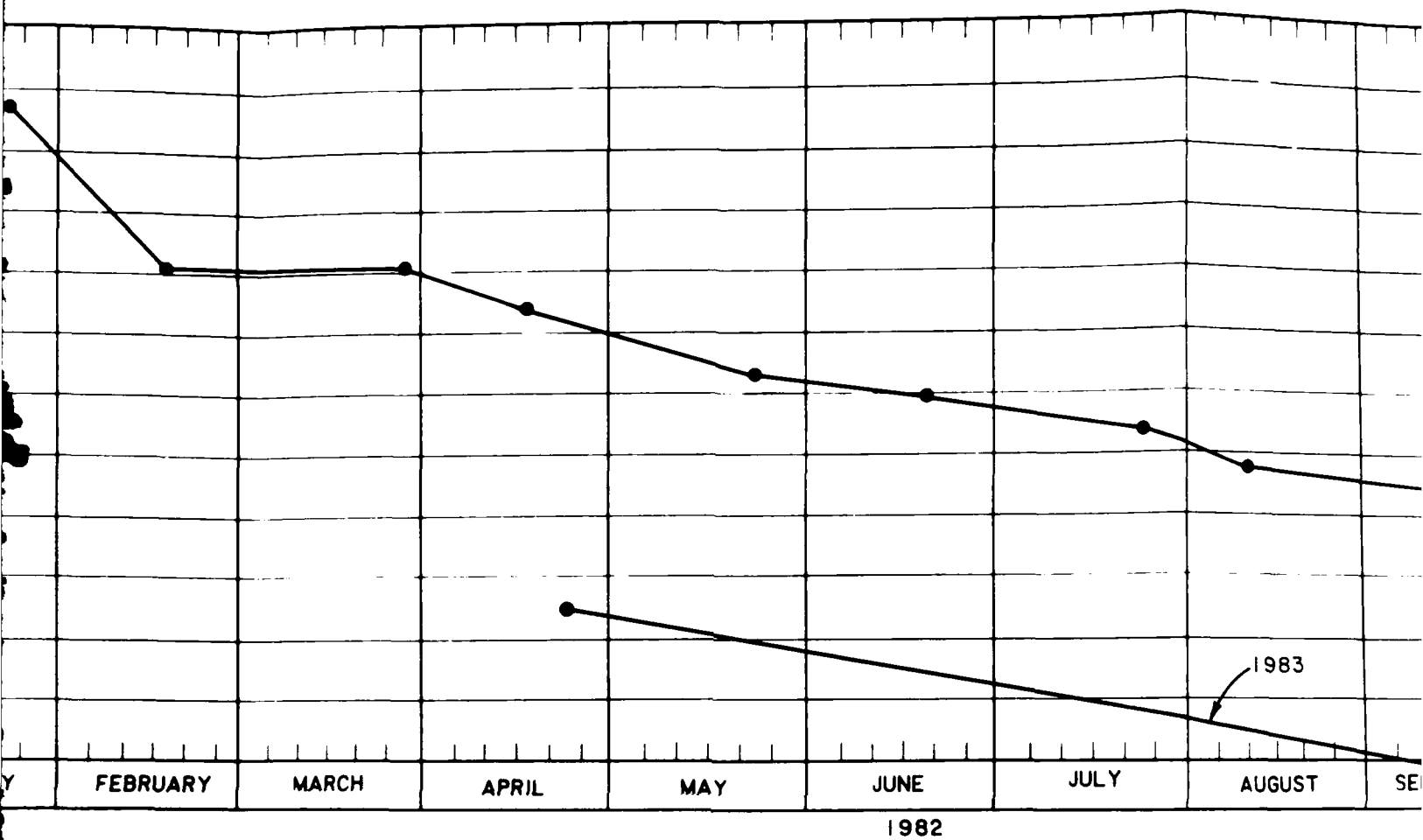
MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

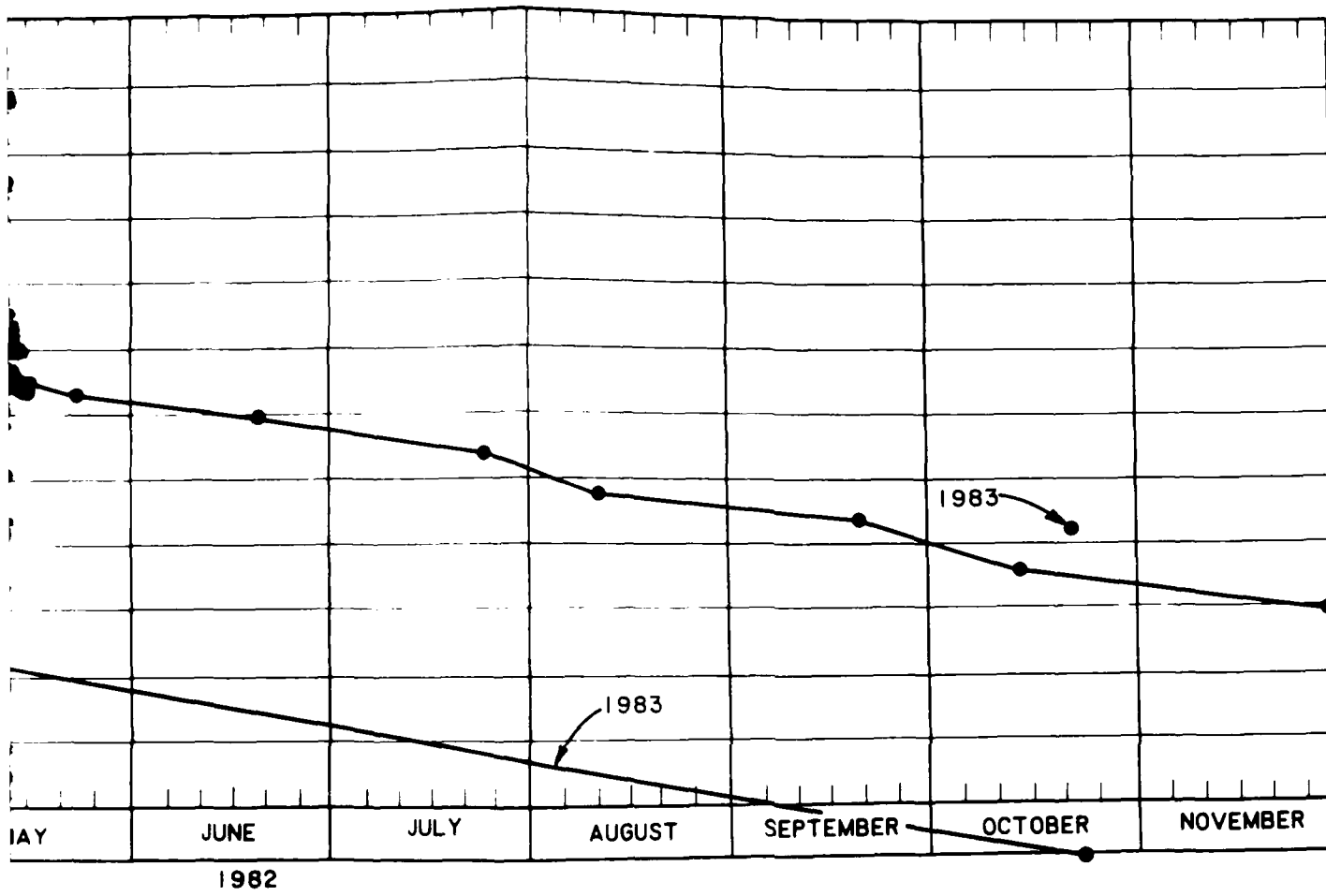
SETTLEMENT DATA

Figure F4





STATION 77+44.13 21A-7H

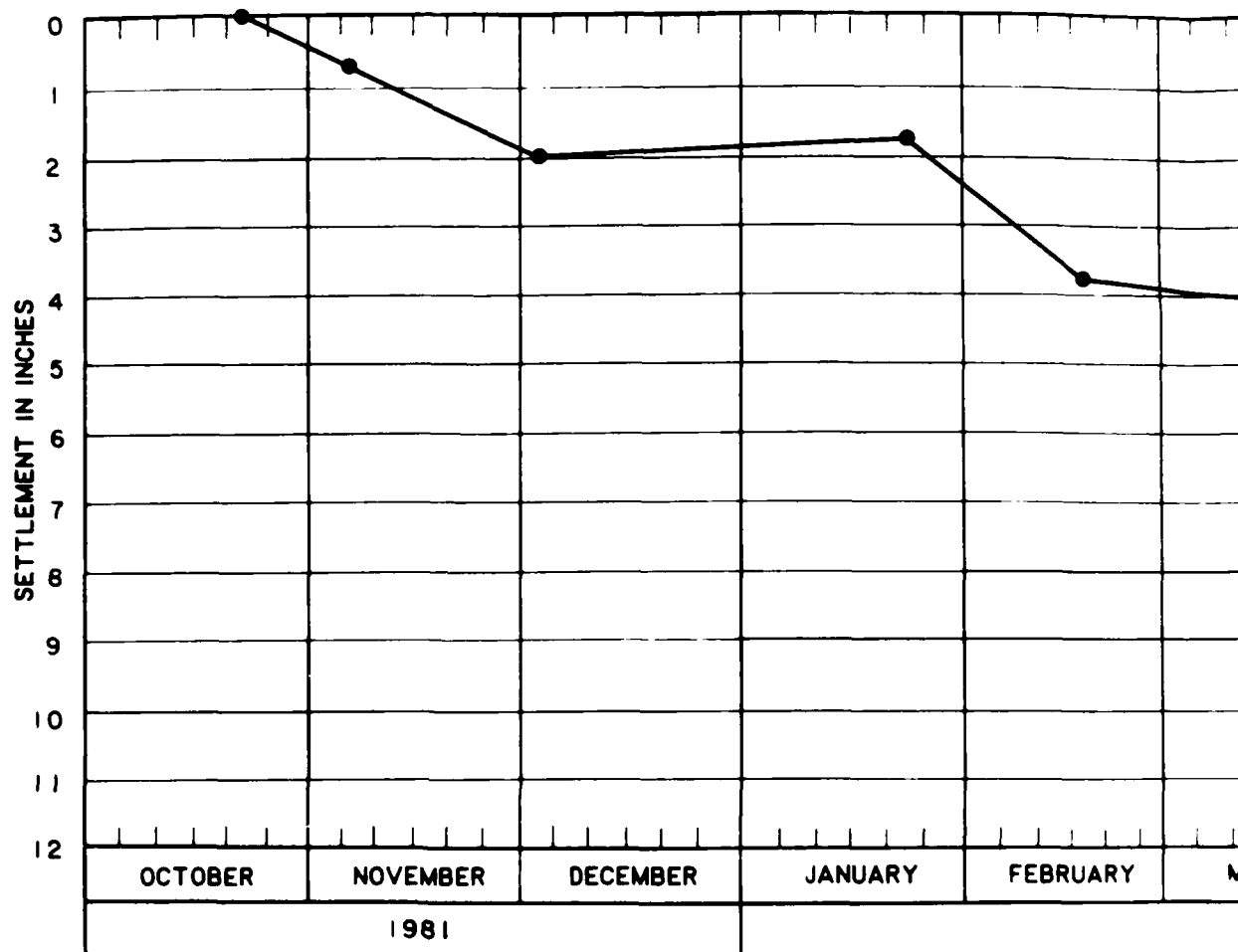


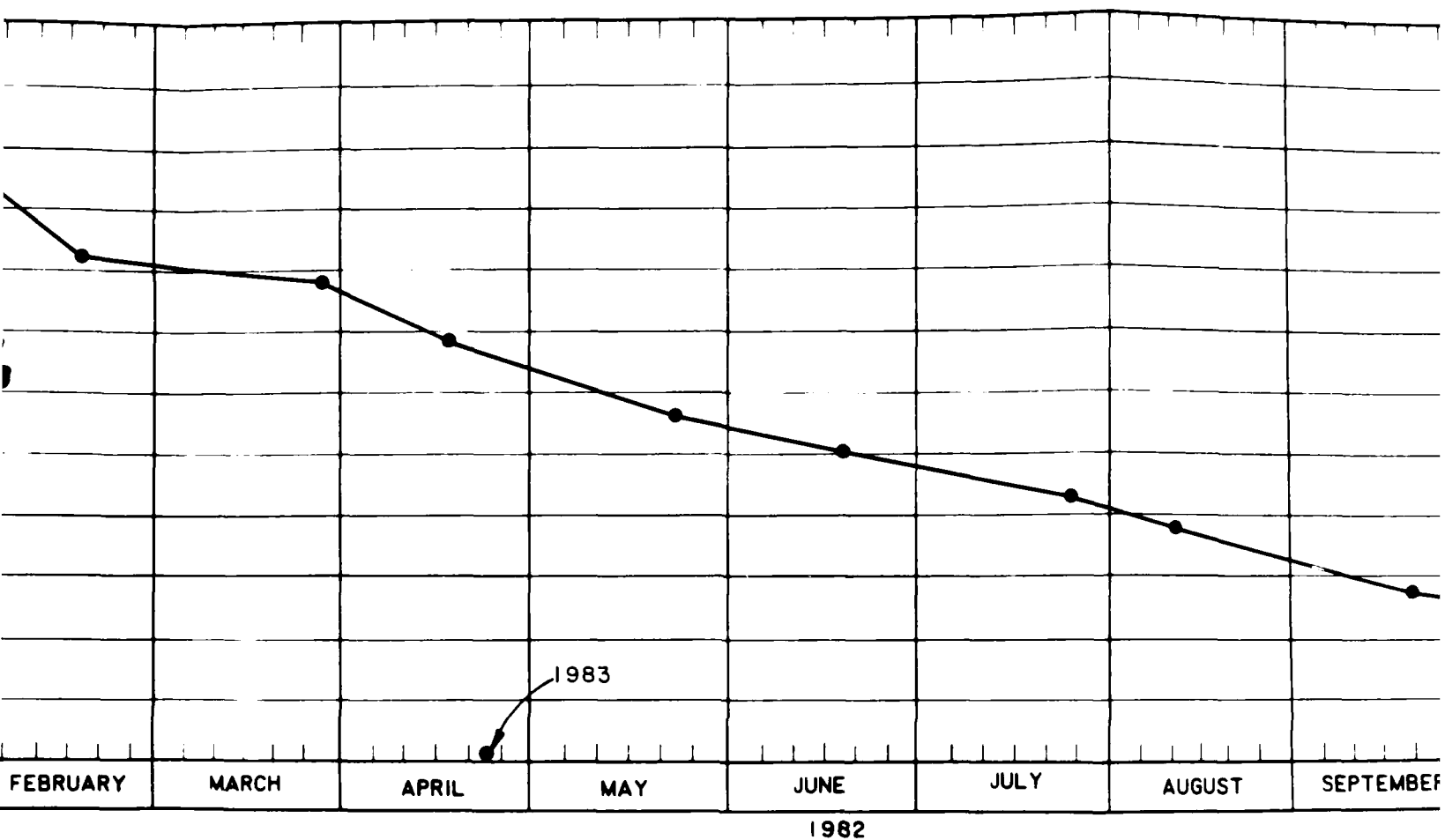
21A-7H

MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

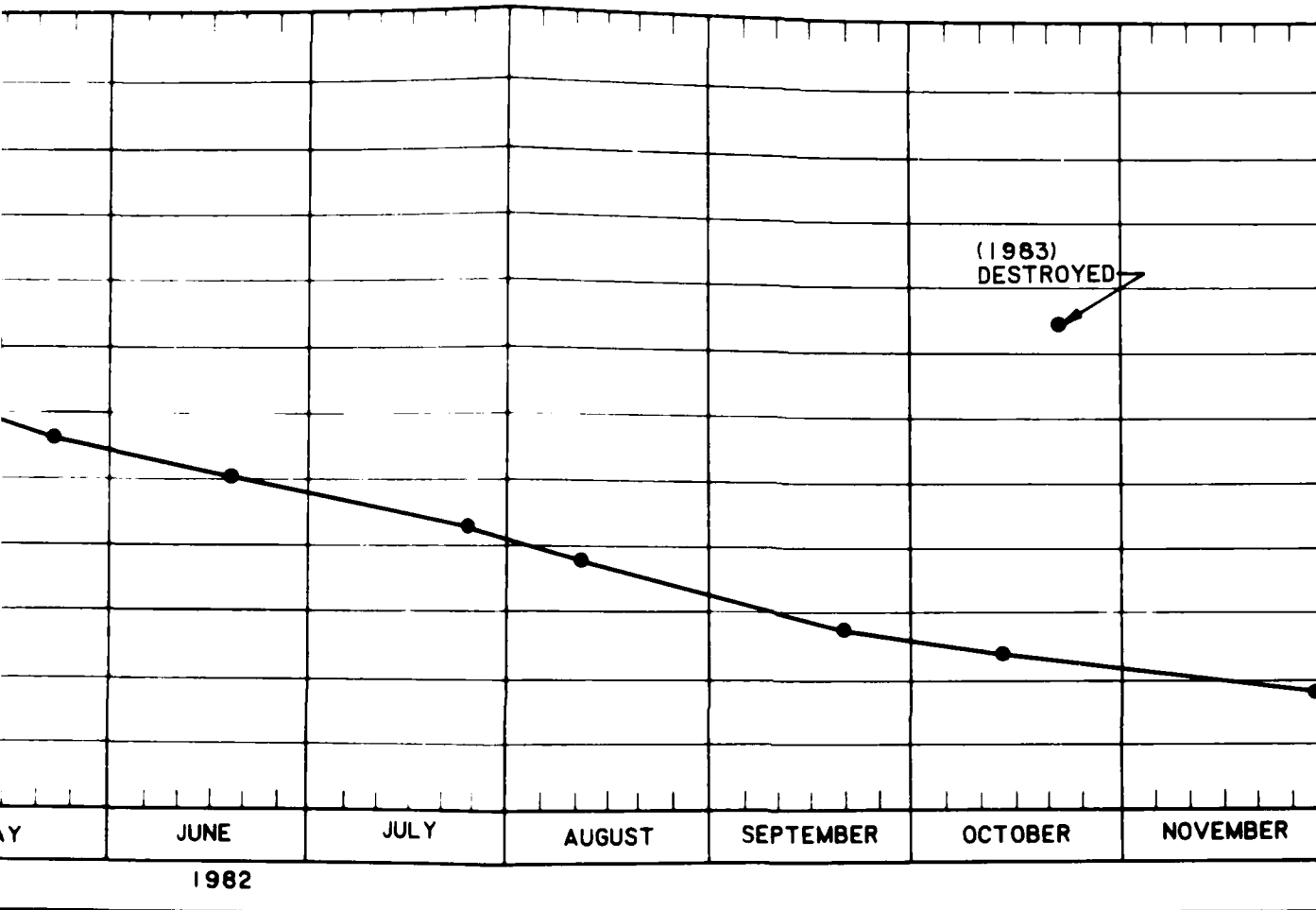
SETTLEMENT DATA





STATION 111+27.98 21A-7K

MC

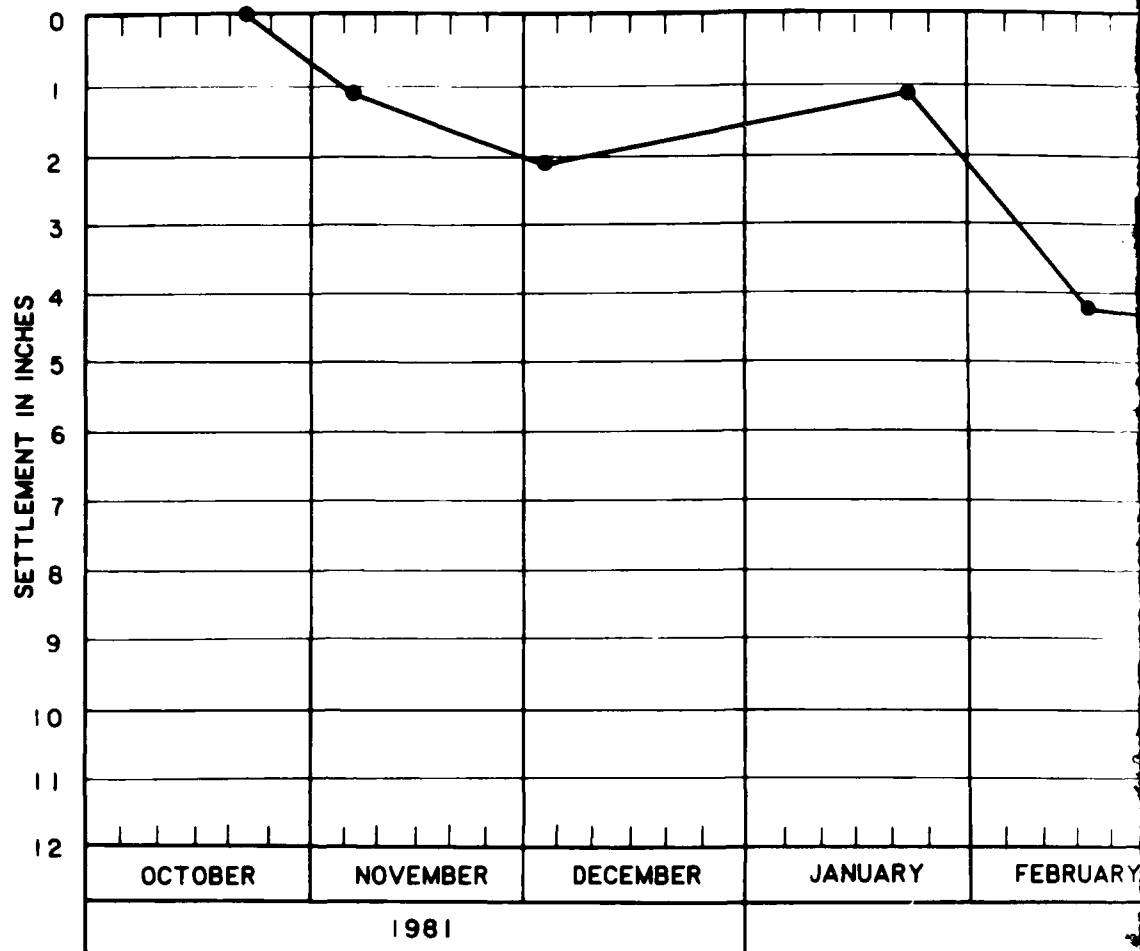


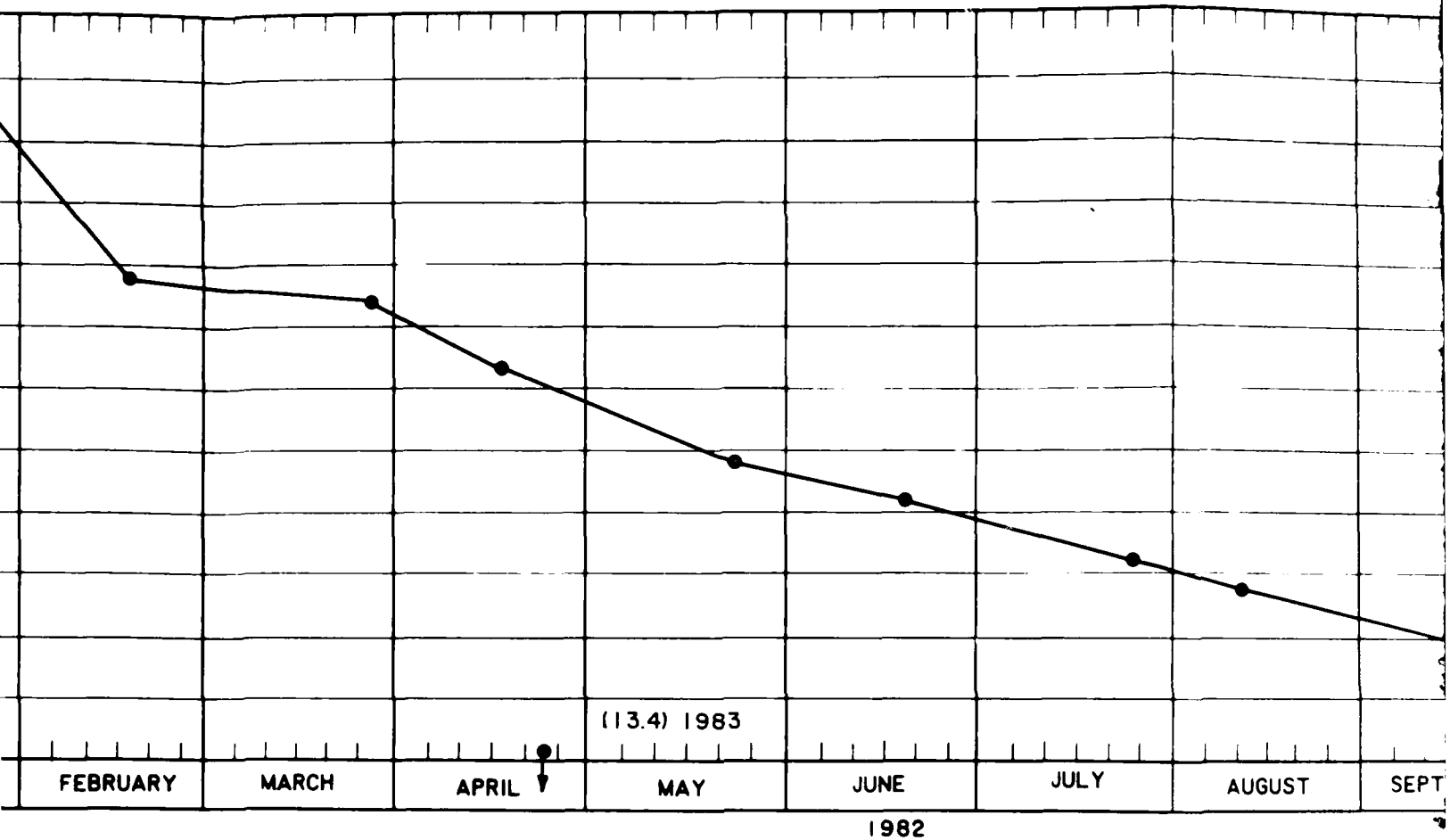
21A-7K

MOBILE HARBOR, ALABAMA

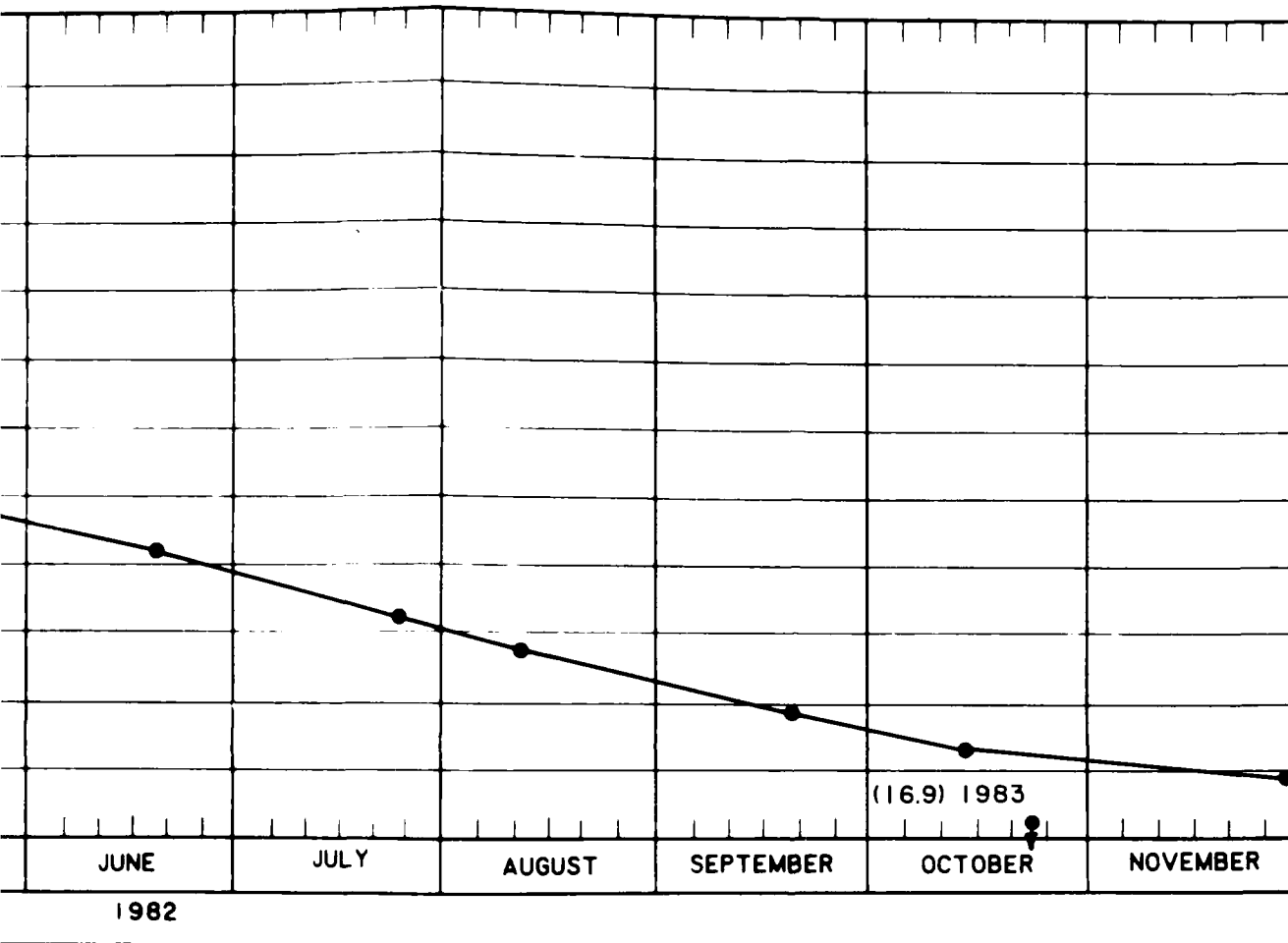
GAILLARD
DISPOSAL ISLAND

SETTLEMENT DATA





STATION 138+38.40 21A-7M

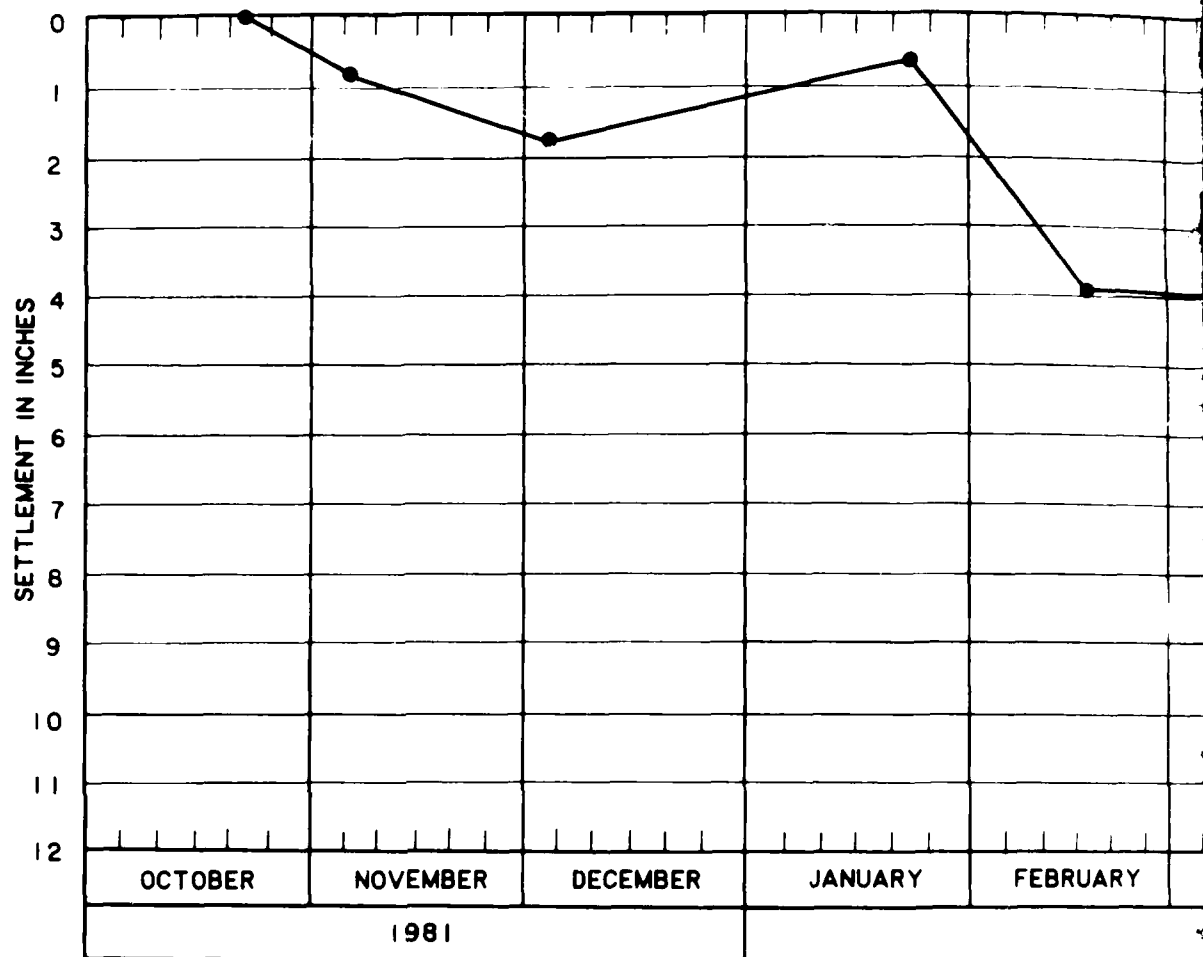


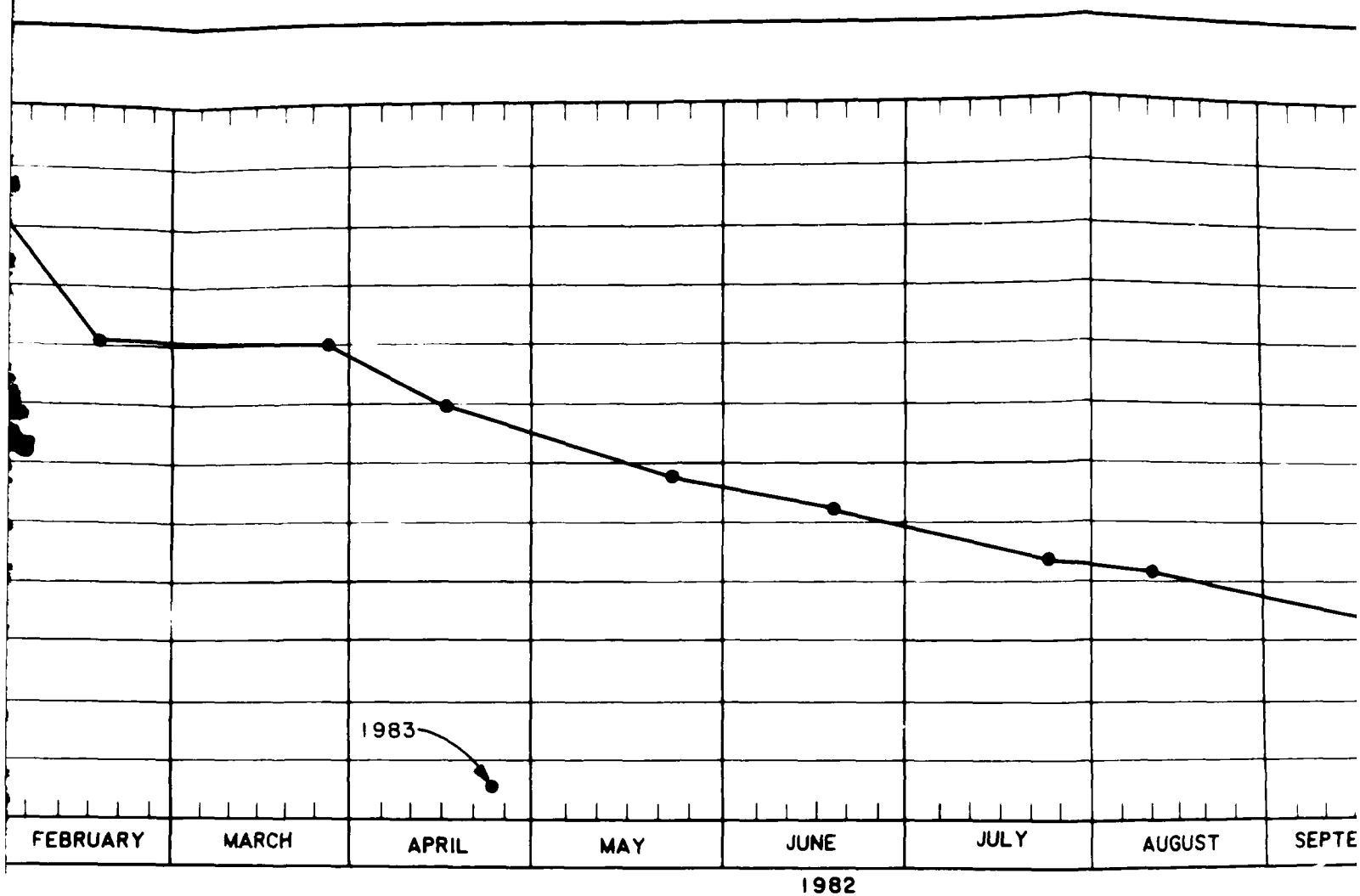
A-7M

MOBILE HARBOR, ALABAMA

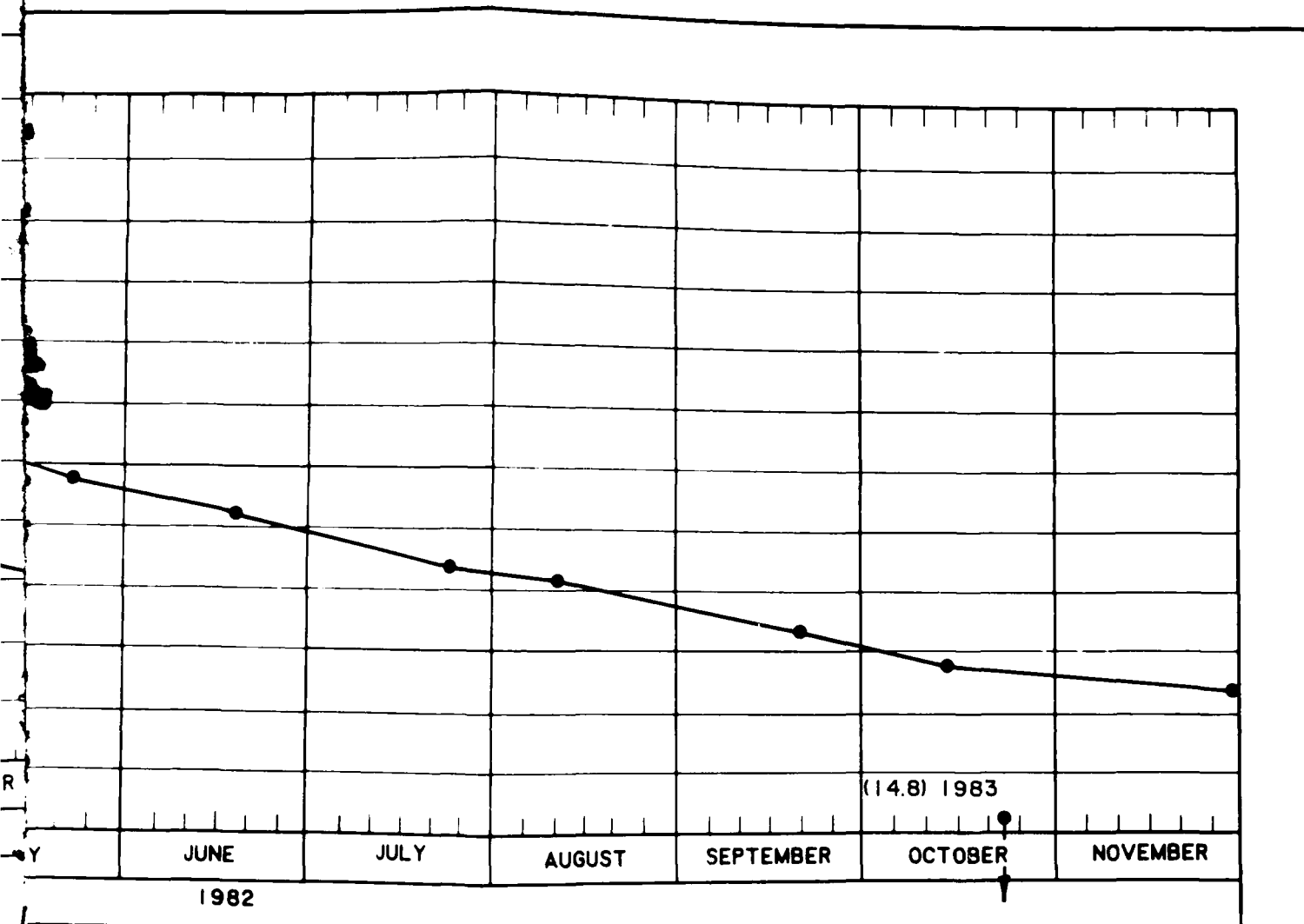
GAILLARD
DISPOSAL ISLAND

SETTLEMENT DATA





STATION 158+25.46 21A-7P



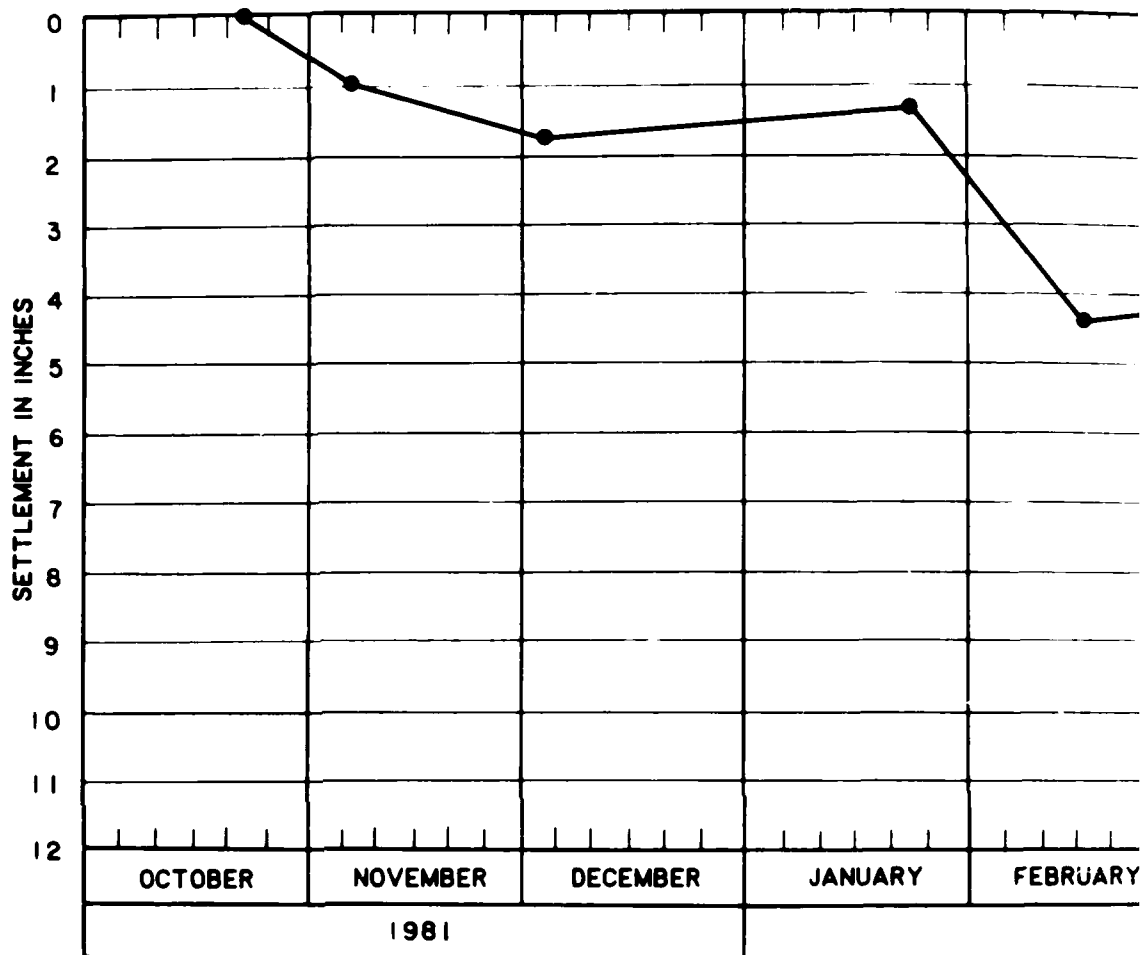
21A-7P

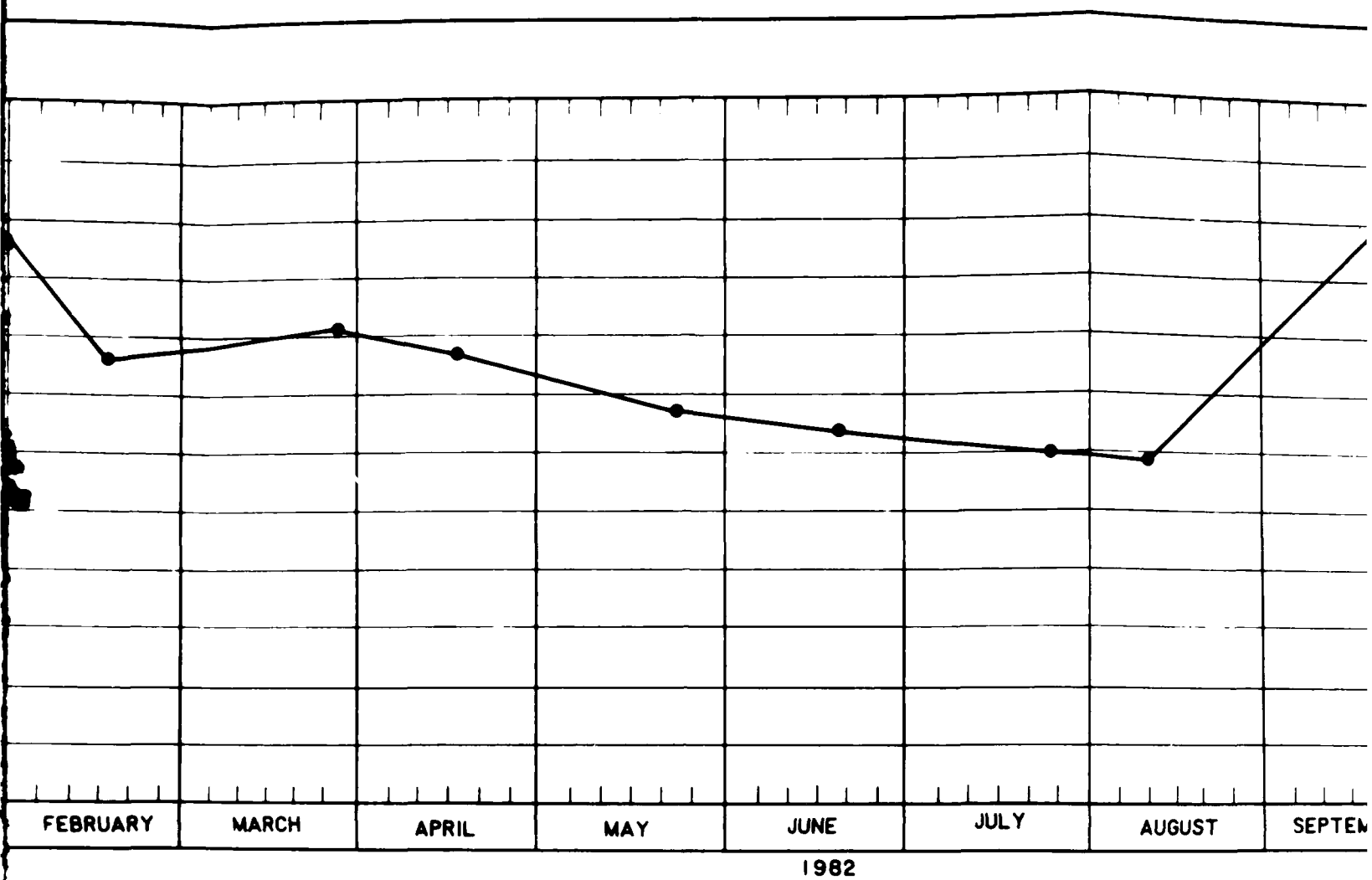
MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

SETTLEMENT DATA

Figure F8

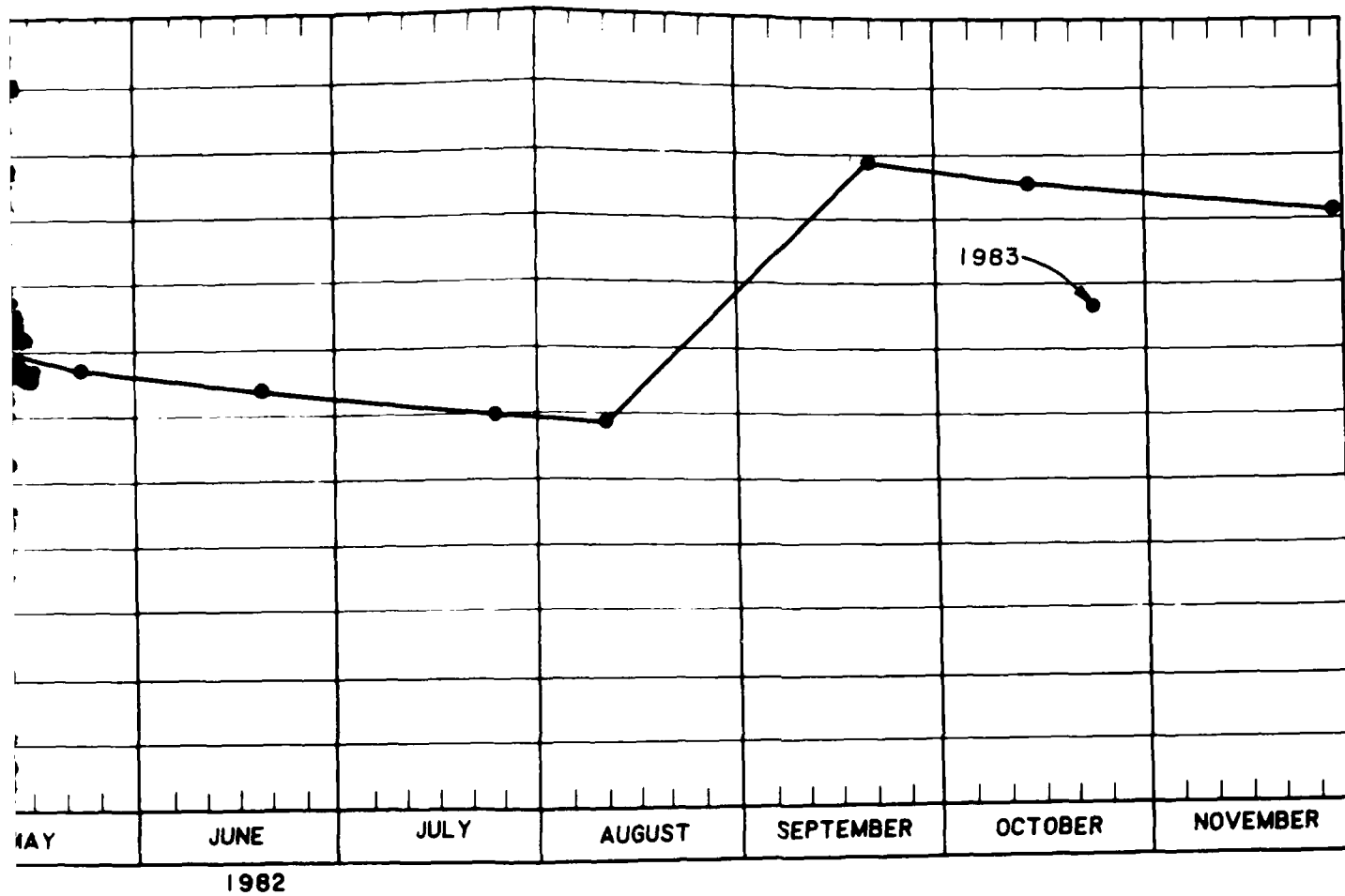




STATION 202+51.2 | 21A-7R

1

2

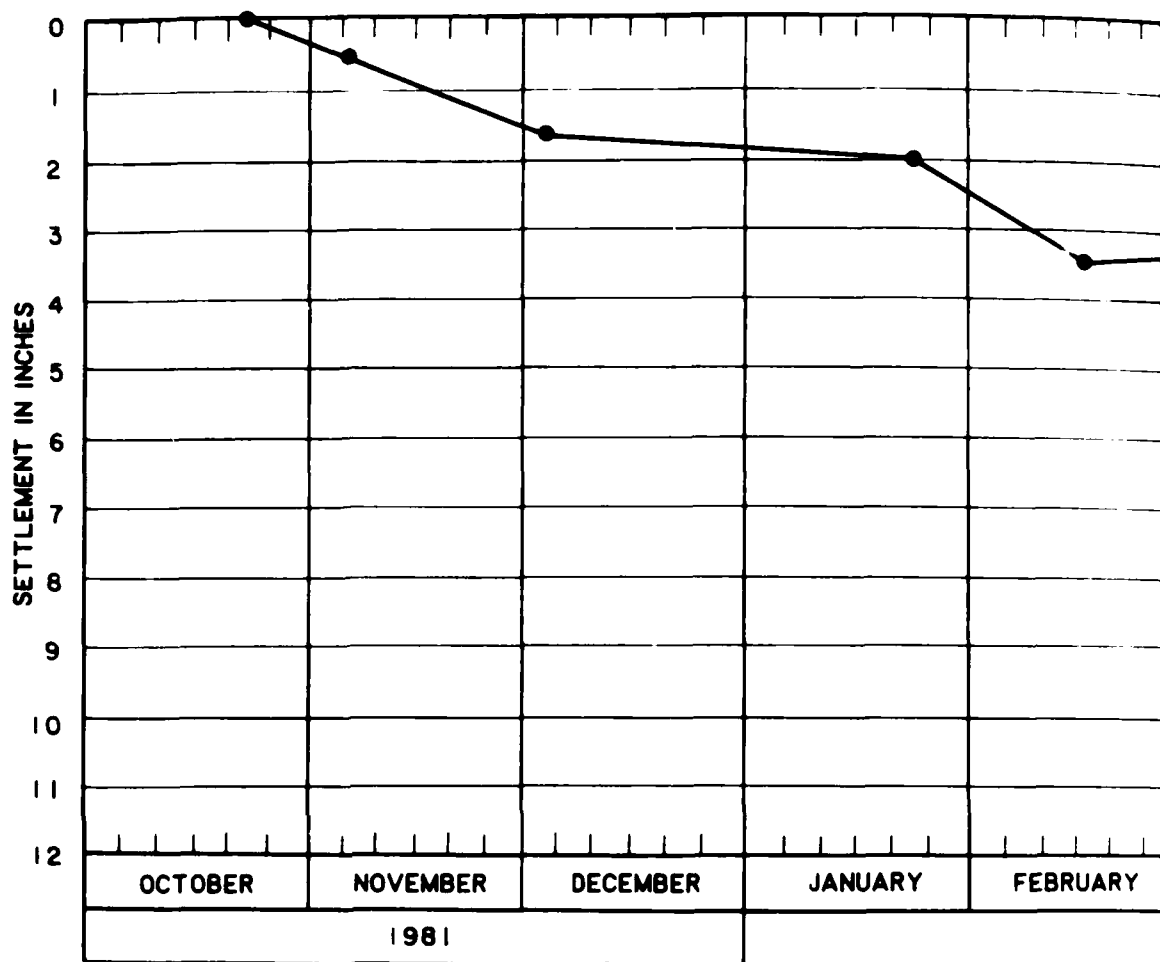


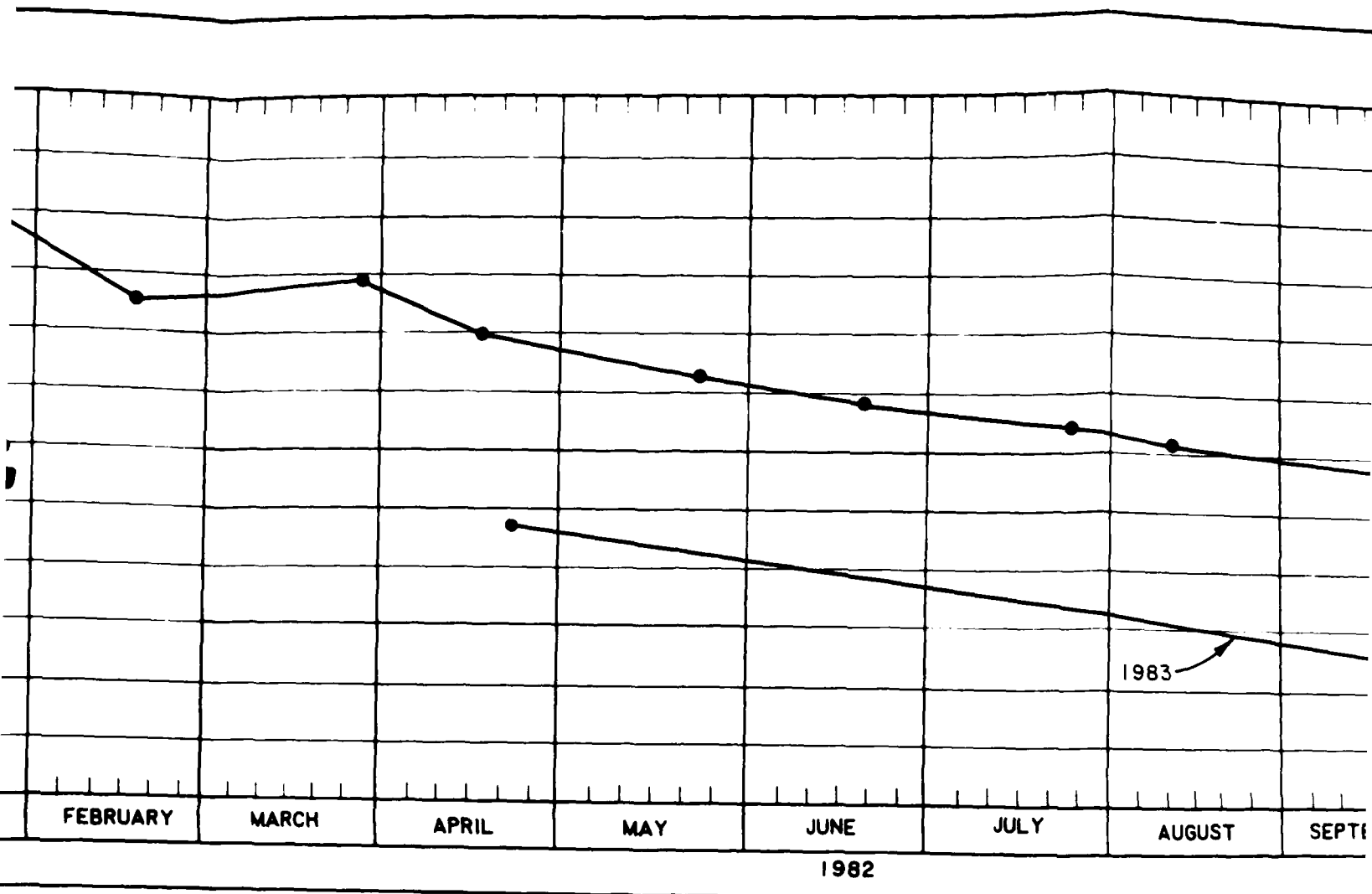
1 21A-7R

MOBILE HARBOR, ALABAMA

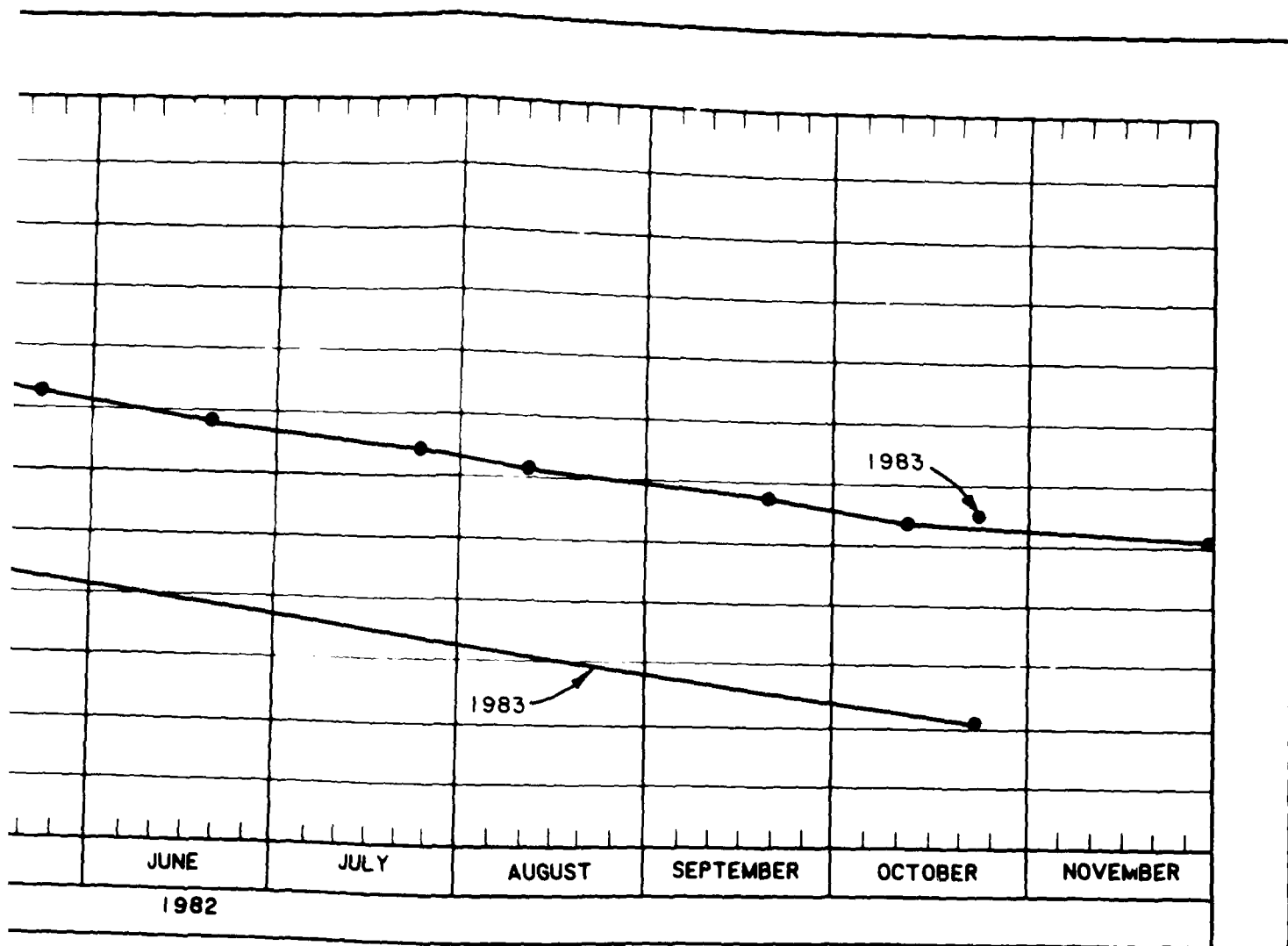
GAILLARD
DISPOSAL ISLAND

SETTLEMENT DATA





STATION 233+67.95 21A-7T

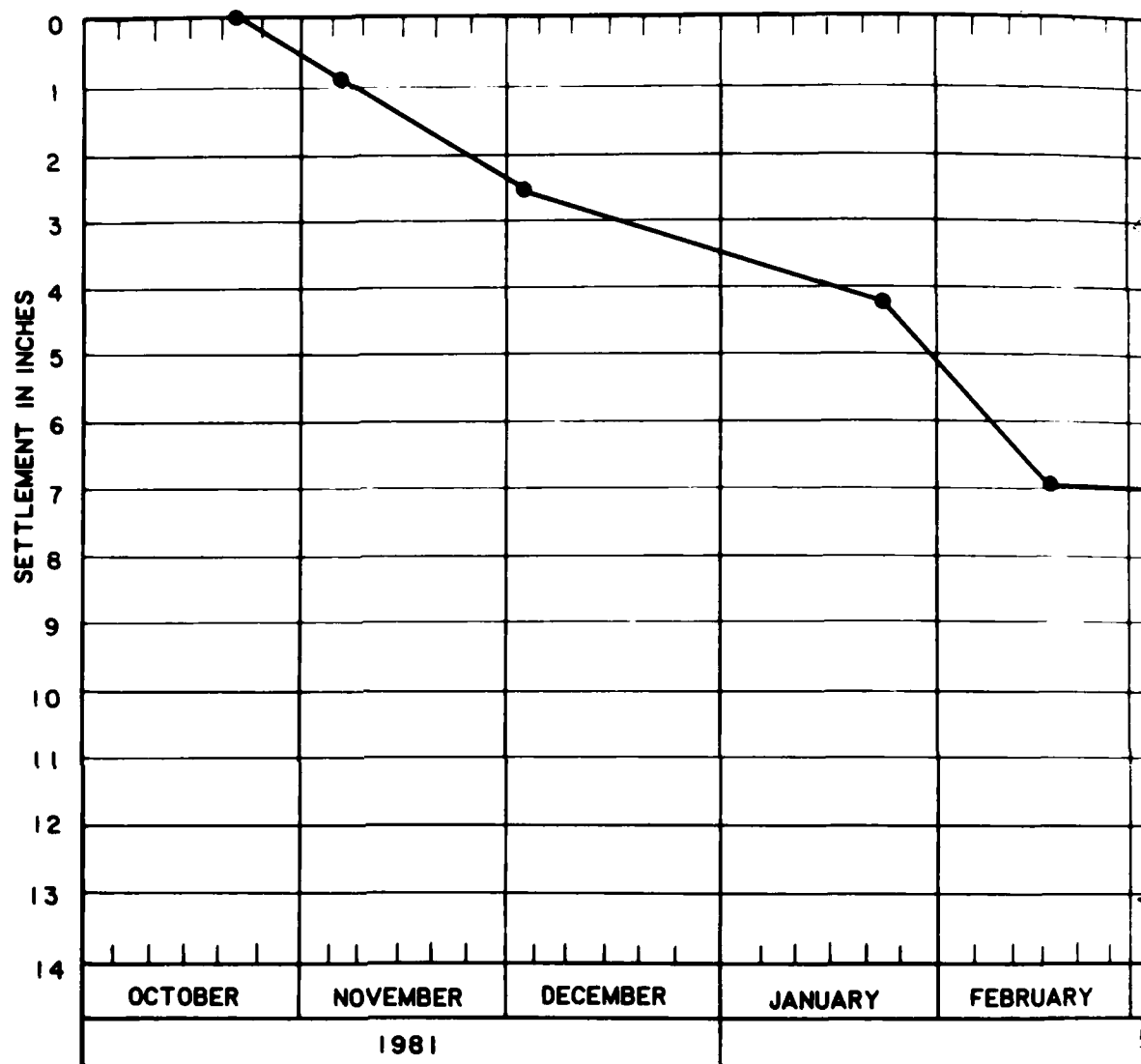


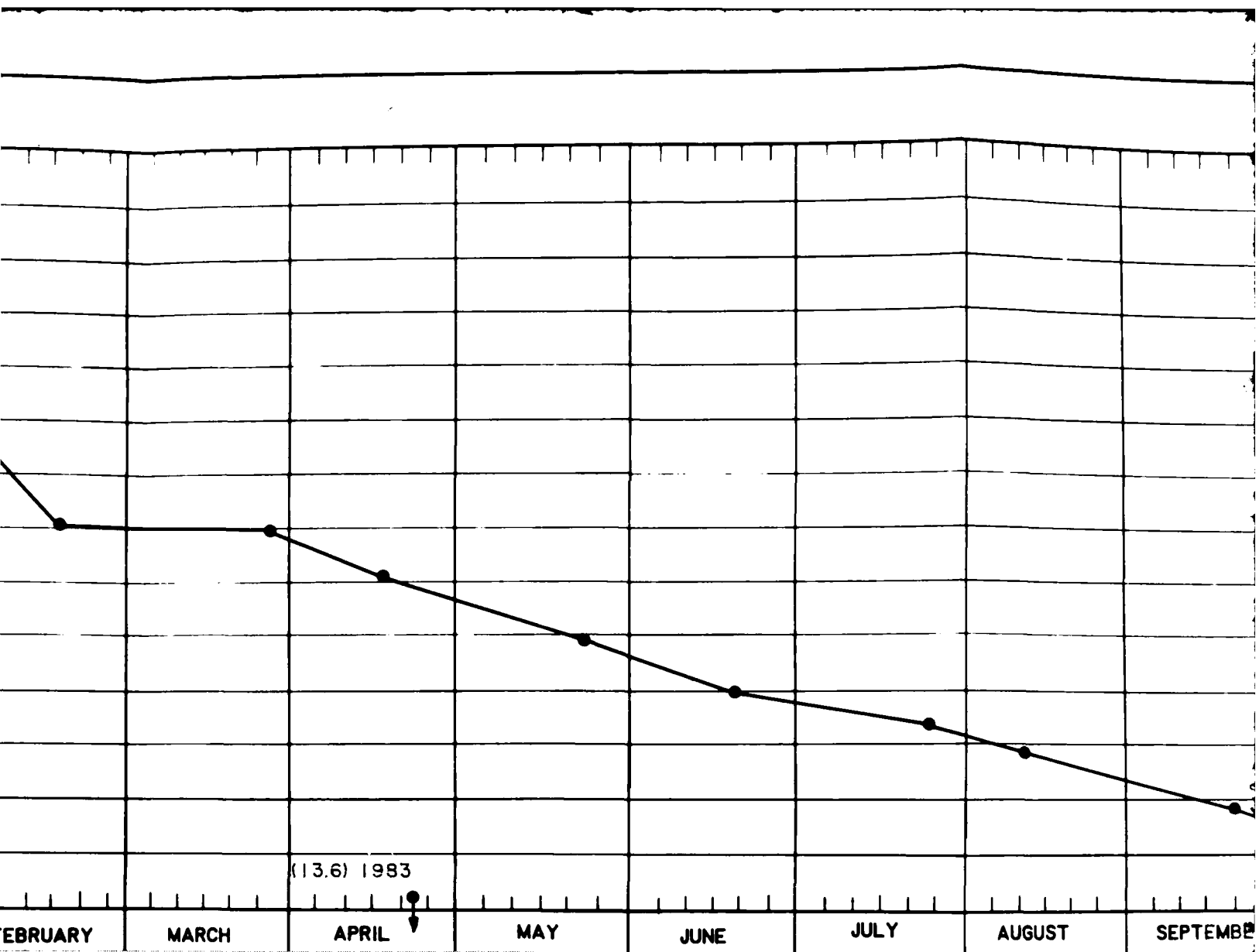
21A-7T

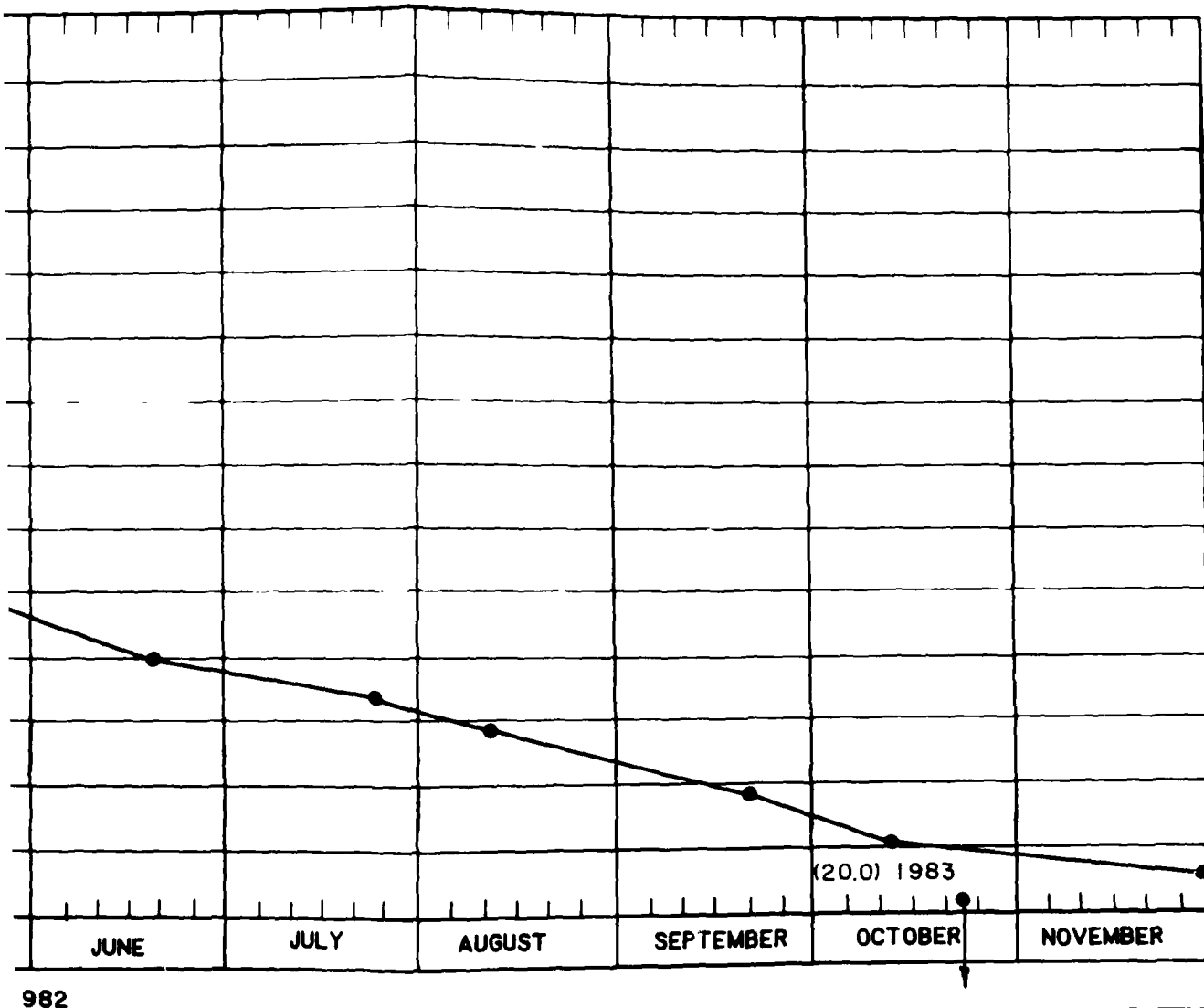
MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

SETTLEMENT DATA







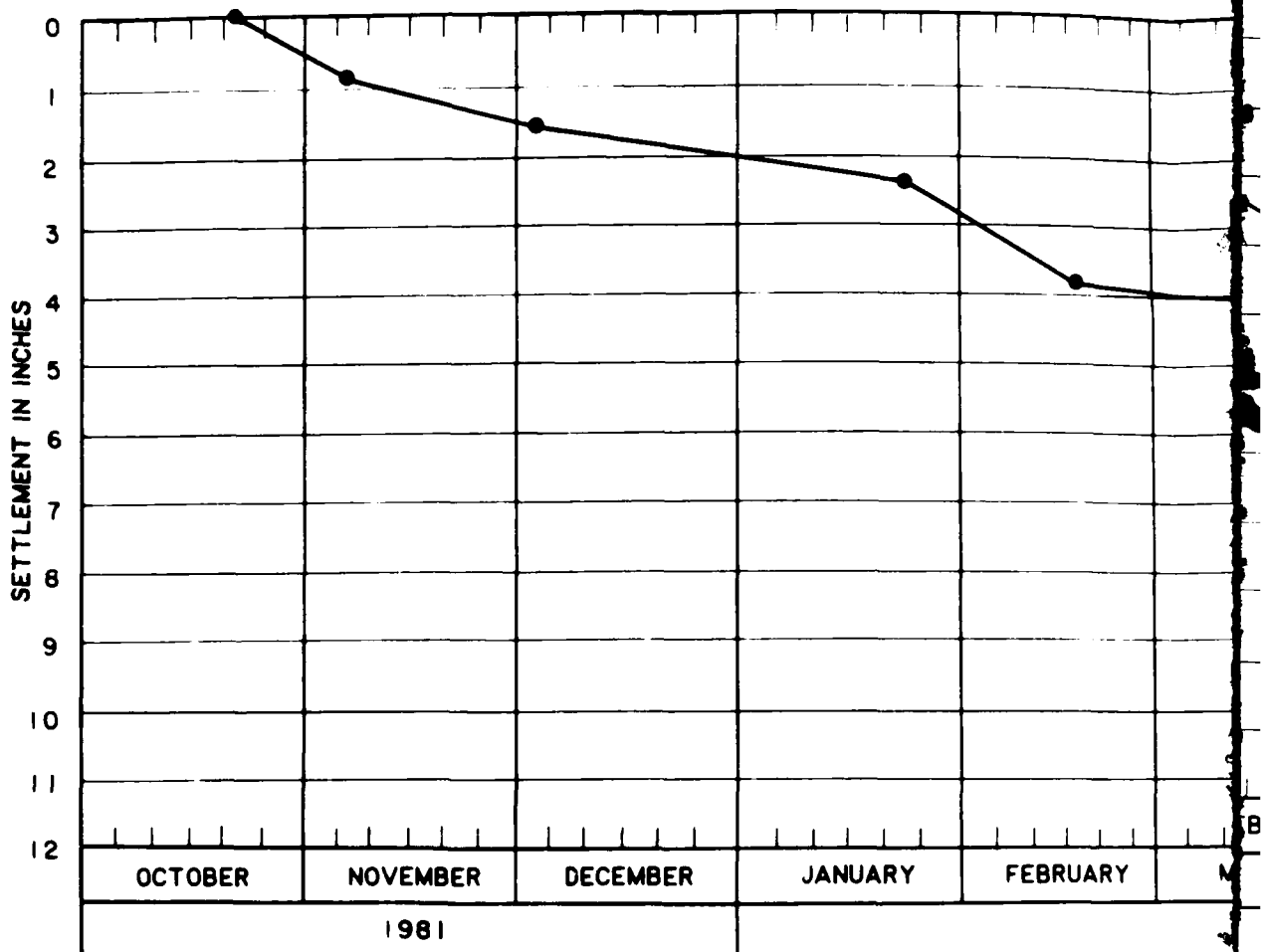
-7V

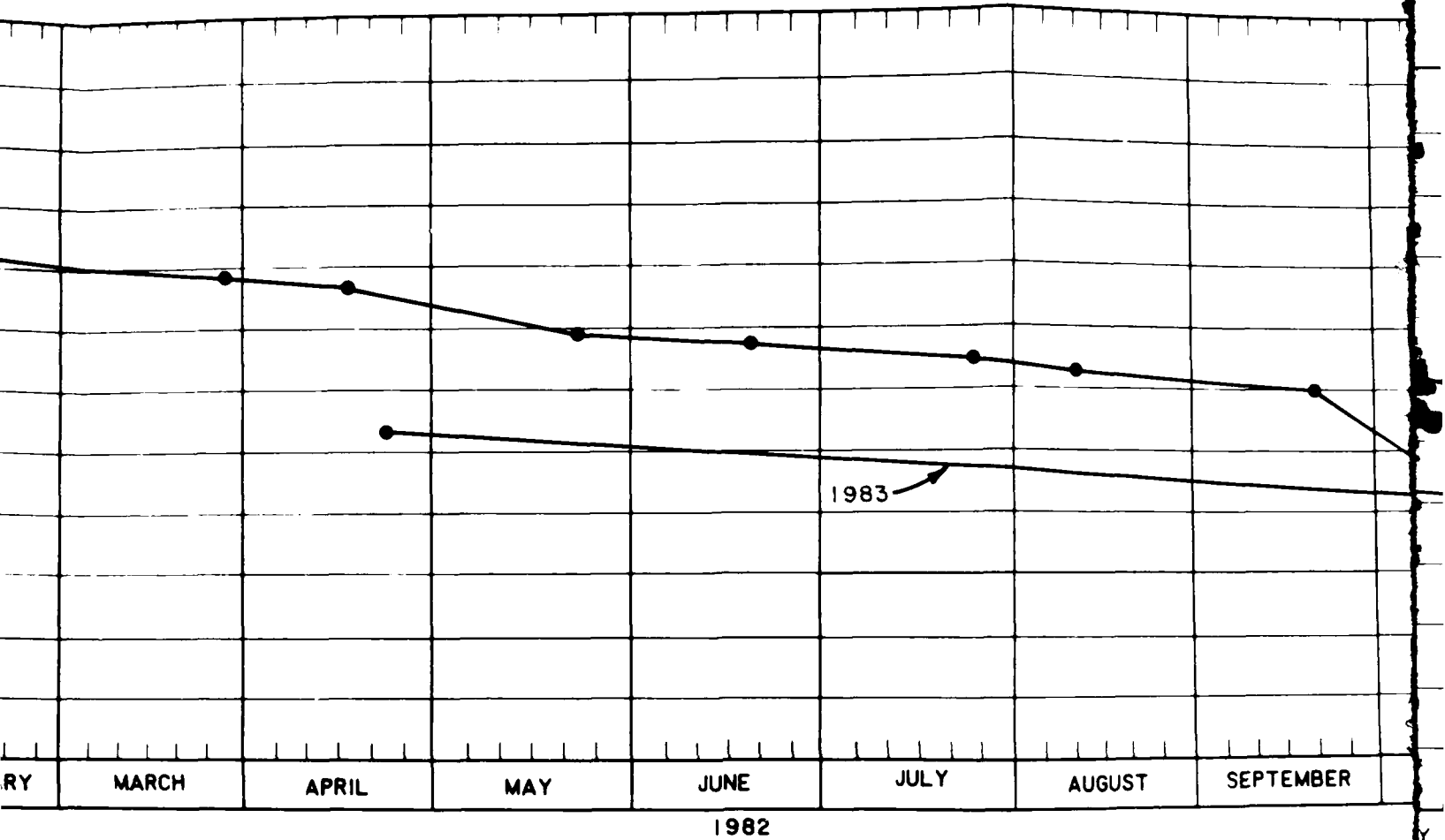
MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

SETTLEMENT DATA

Figure F11



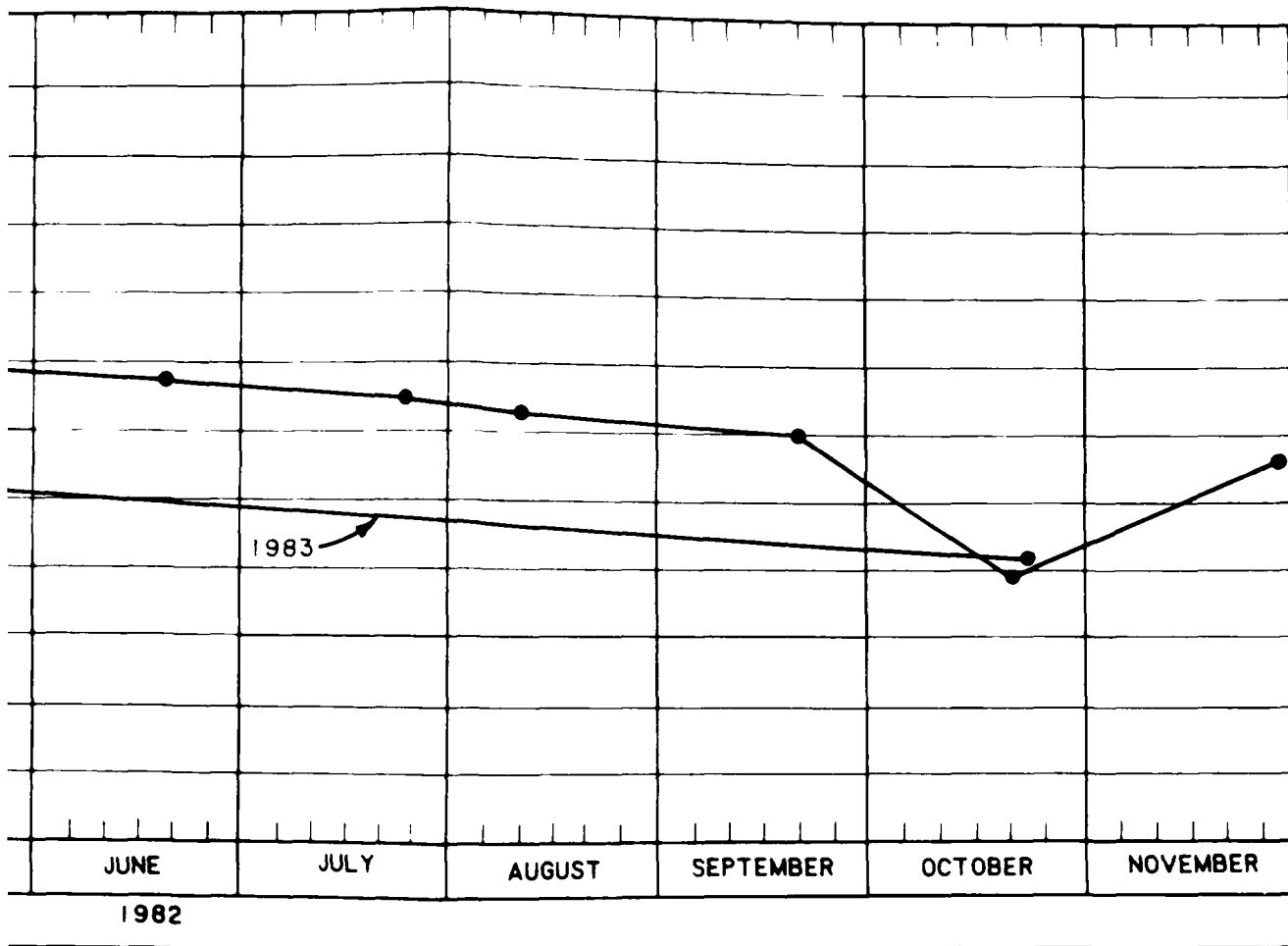


STATION 283+99.24 21A-7X

MOBILE

DIS

SE



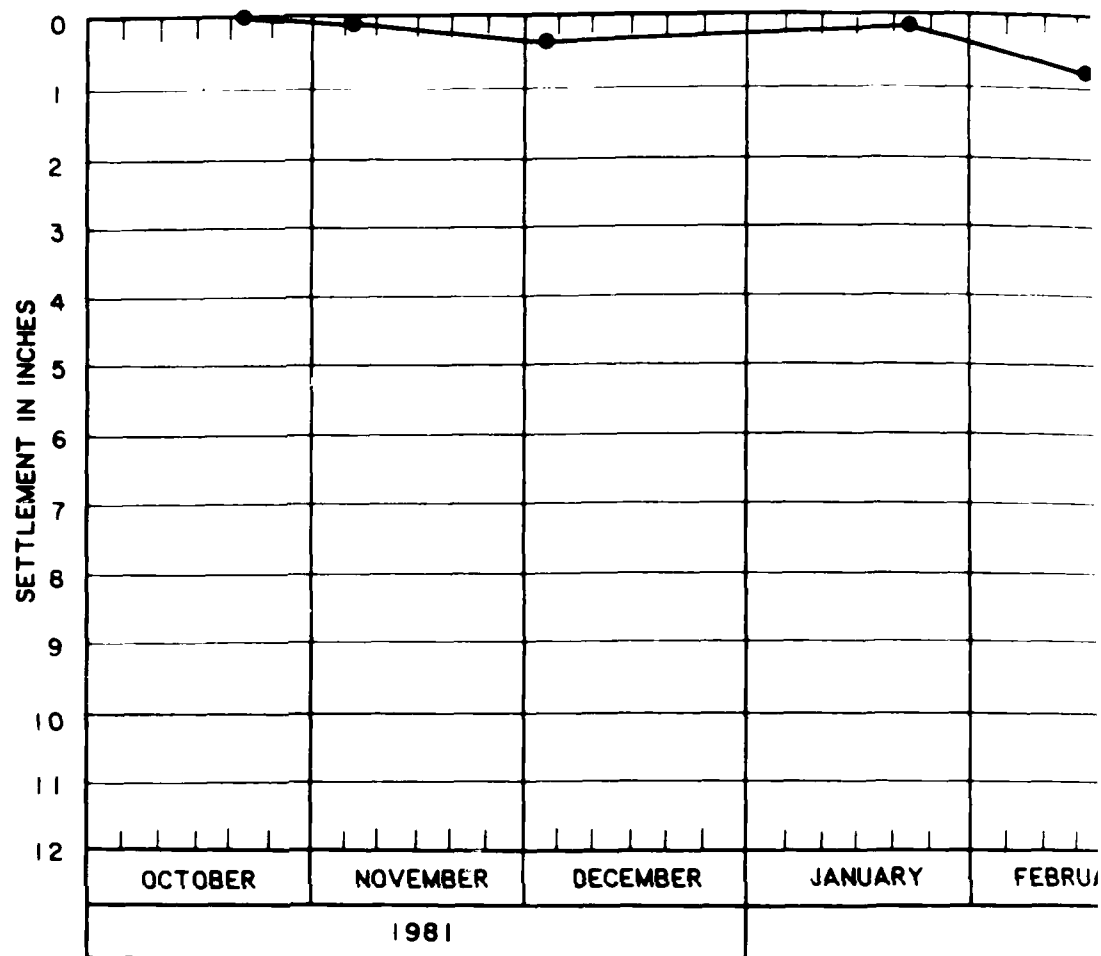
-7X

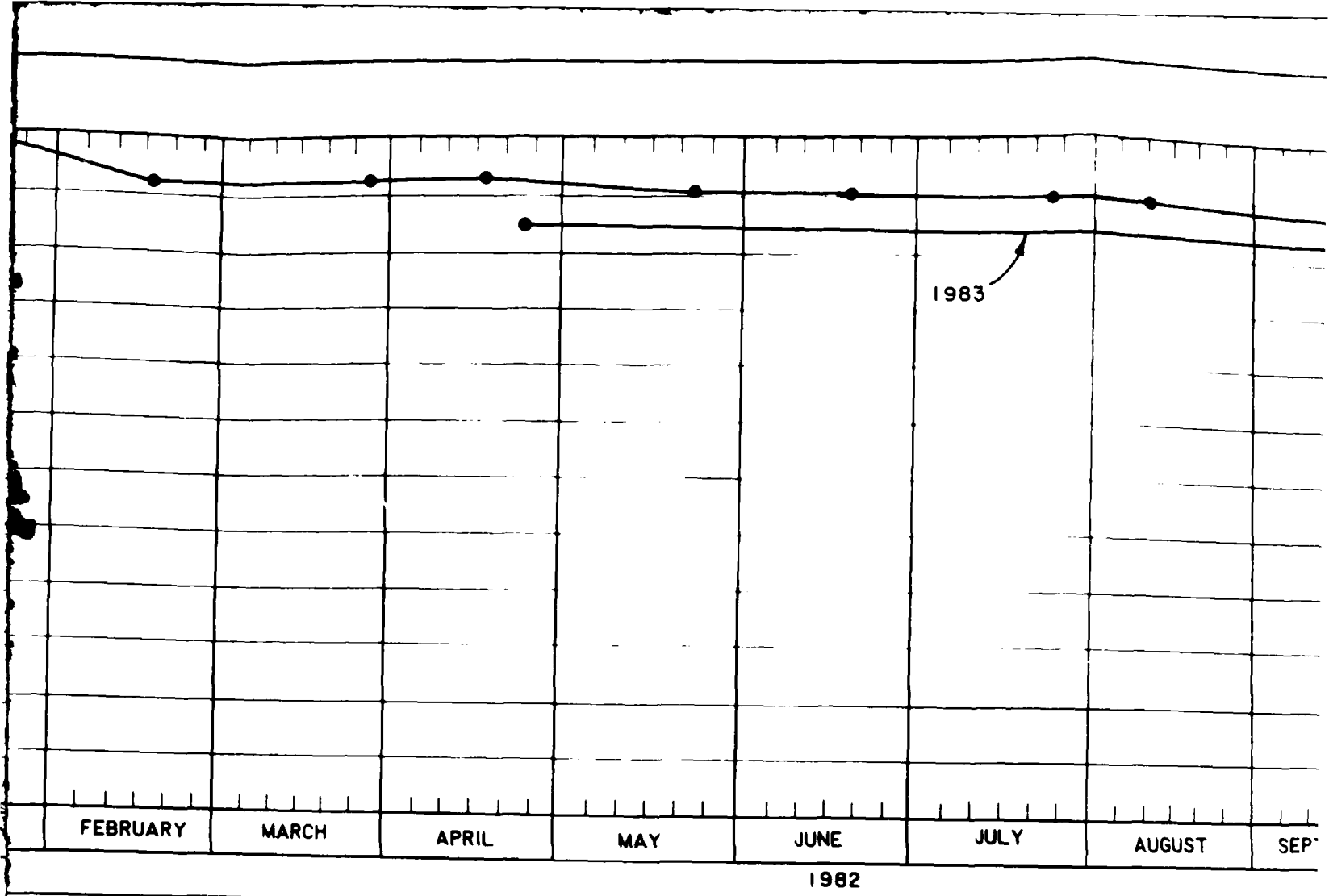
MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

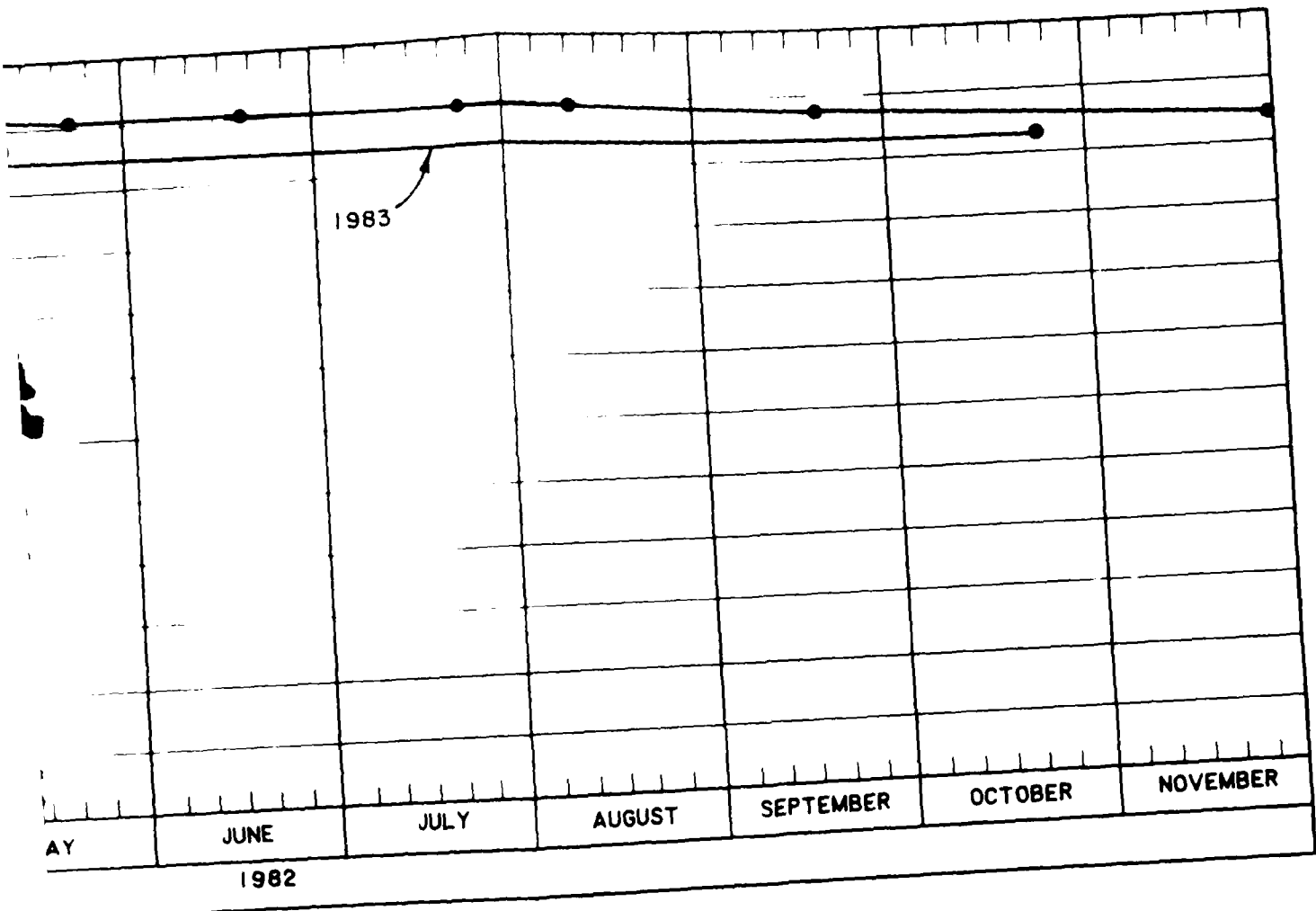
SETTLEMENT DATA

Figure F12





STATION 298+23.99 21A-7Z



21A-7Z

MOBILE HARBOR, ALABAMA

GAILLARD
DISPOSAL ISLAND

SETTLEMENT DATA

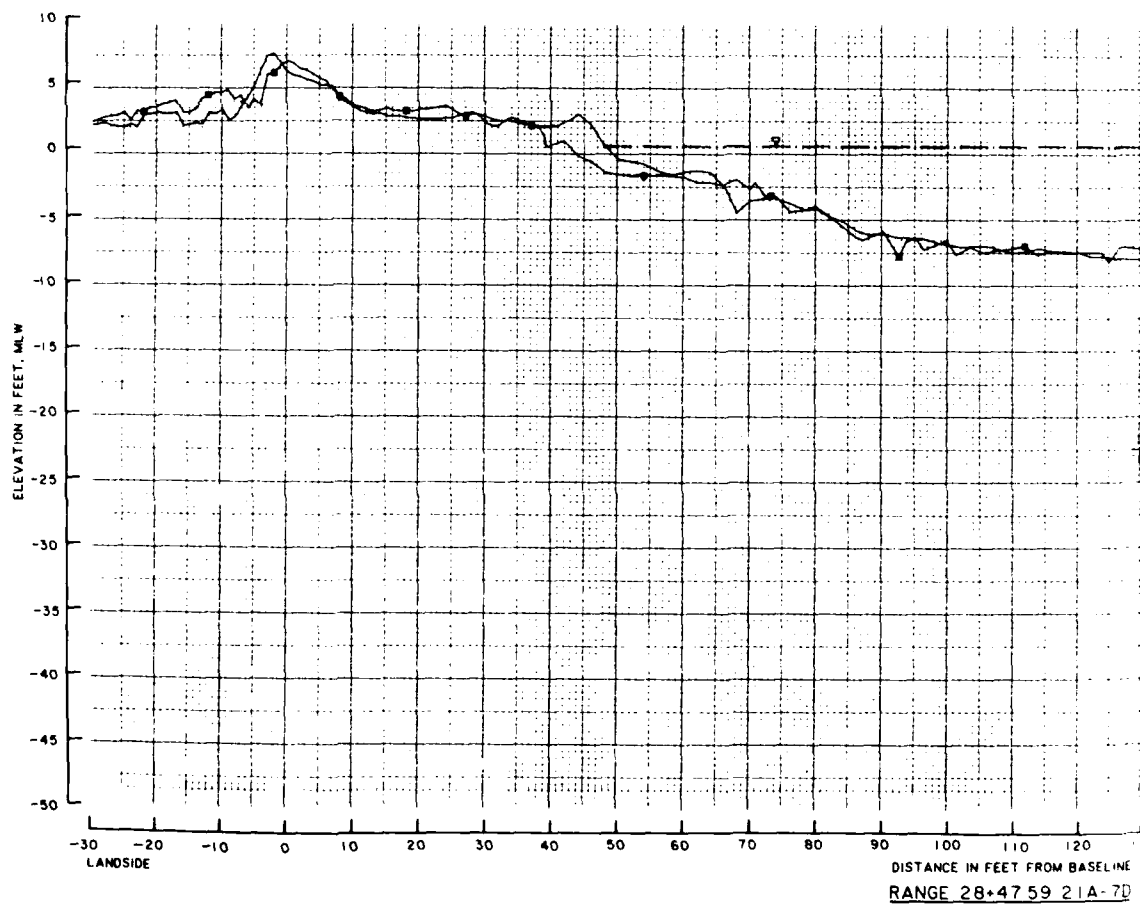
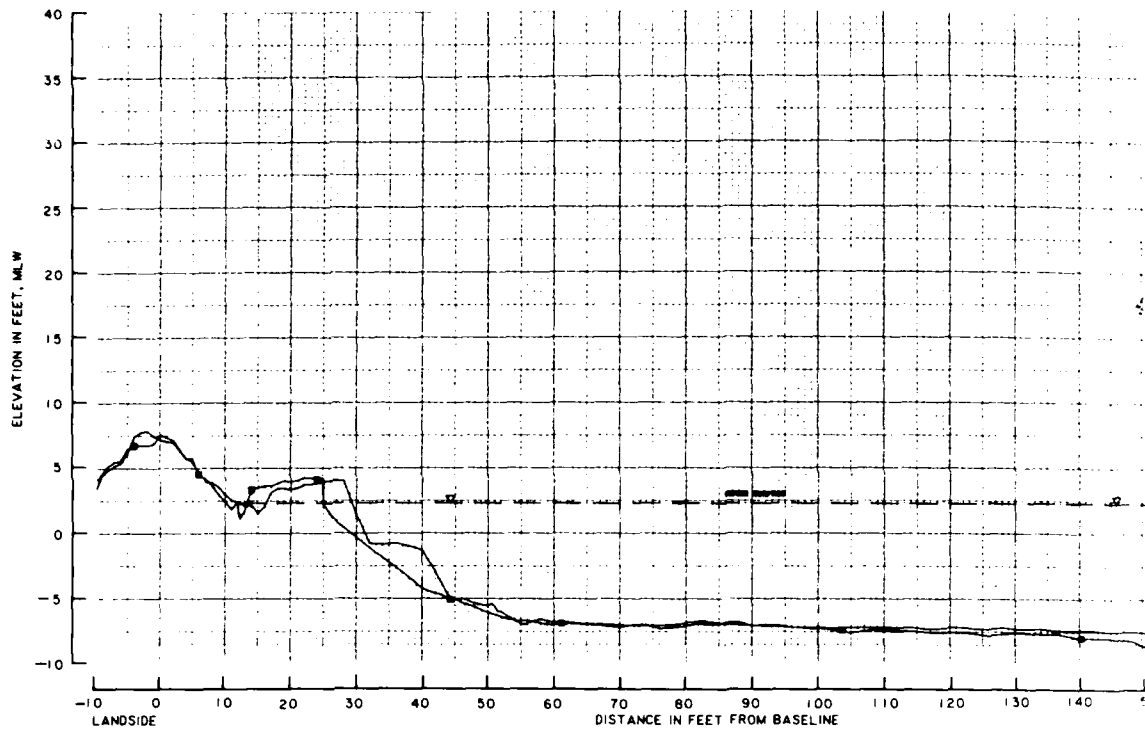
Figure F13

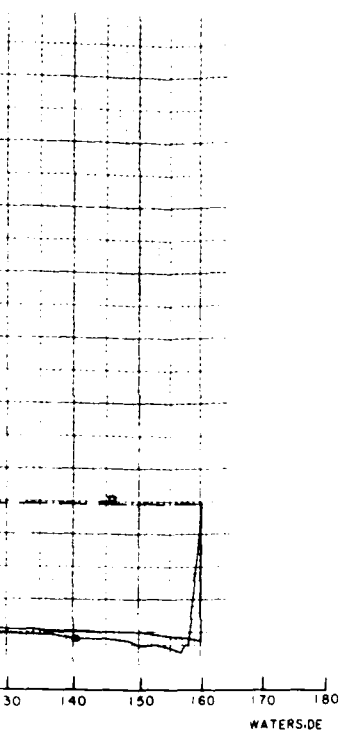
APPENDIX G: LAND AND HYDROGRAPHIC SURVEYS FOR GAILLARD ISLAND AND
THEODORE SHIP CHANNEL.

1. This appendix includes twelve land and hydrographic surveys of the Gaillard Island dike and ship channel near the locations chosen for the instrumentation installation. Figures G1 through G6 show the twelve profile plots of the dike shortly after construction and the most recent surveys available.

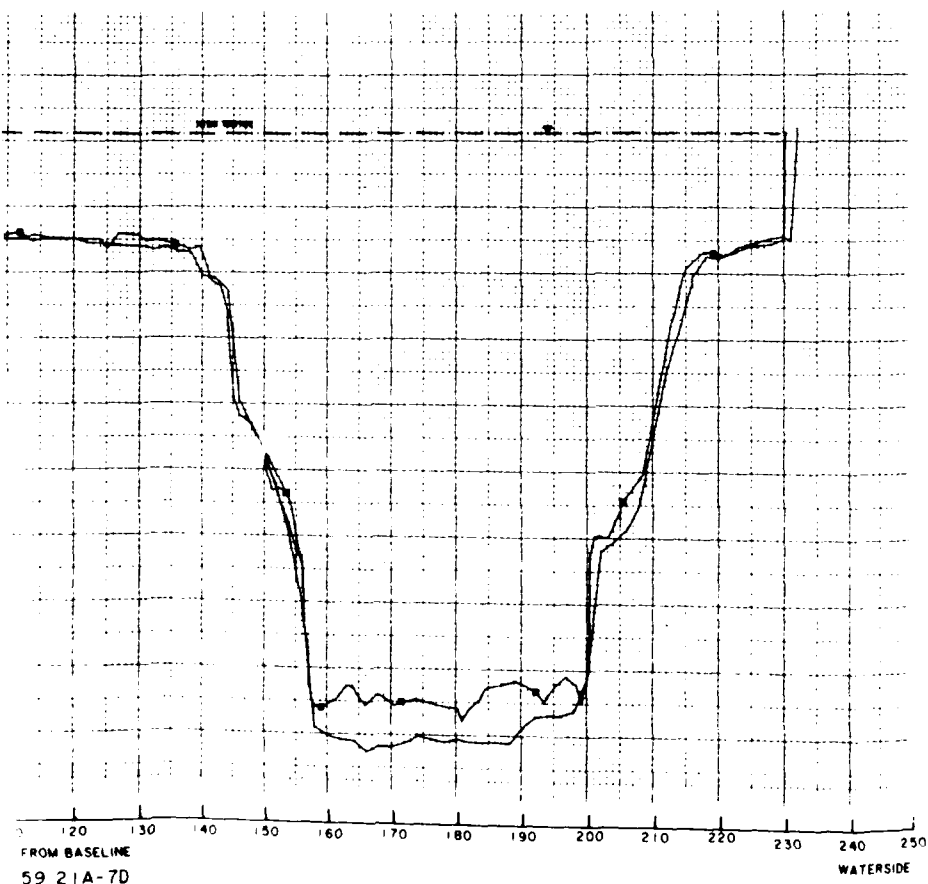
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Land and Hydrographic Survey	G6



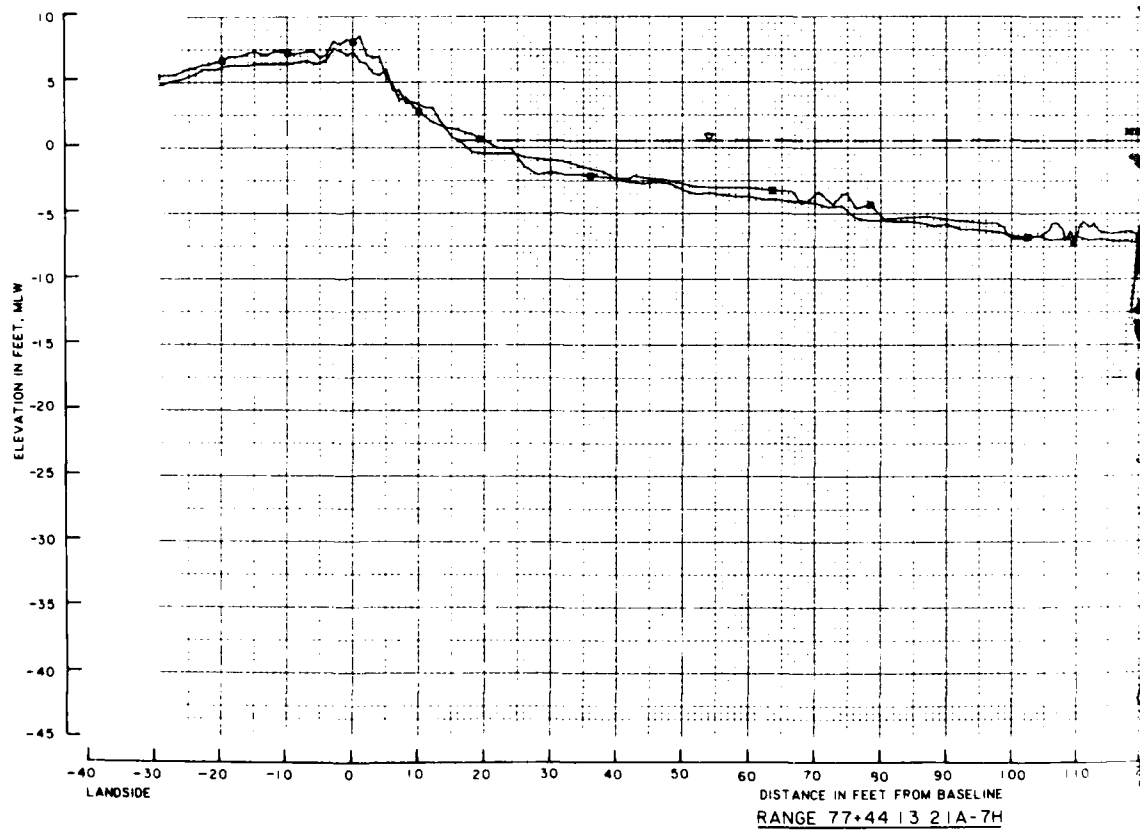
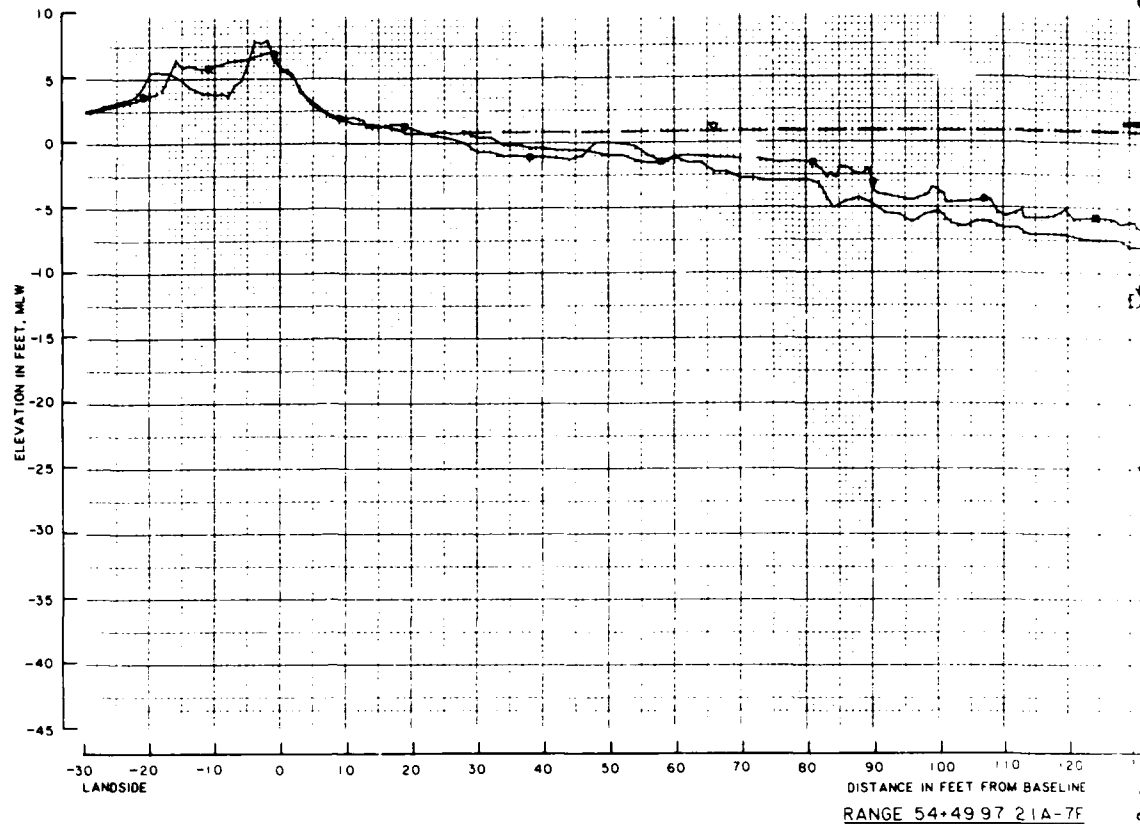


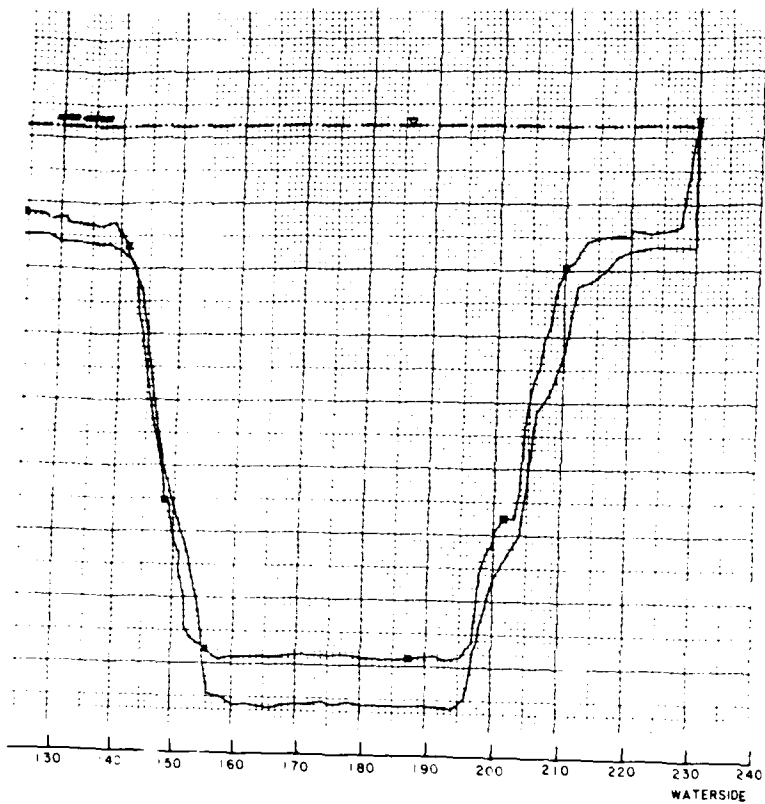
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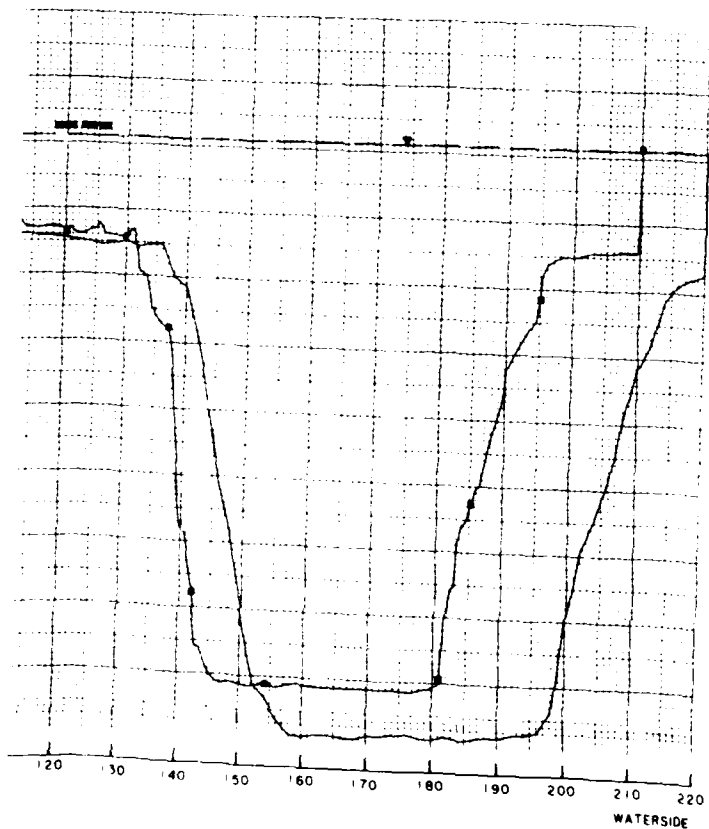
MOBILE HARBOR, ALABAMA
 GAILLARD
 DISPOSAL ISLAND
 LAND AND HYDROGRAPHIC SURVEY

Figure G1



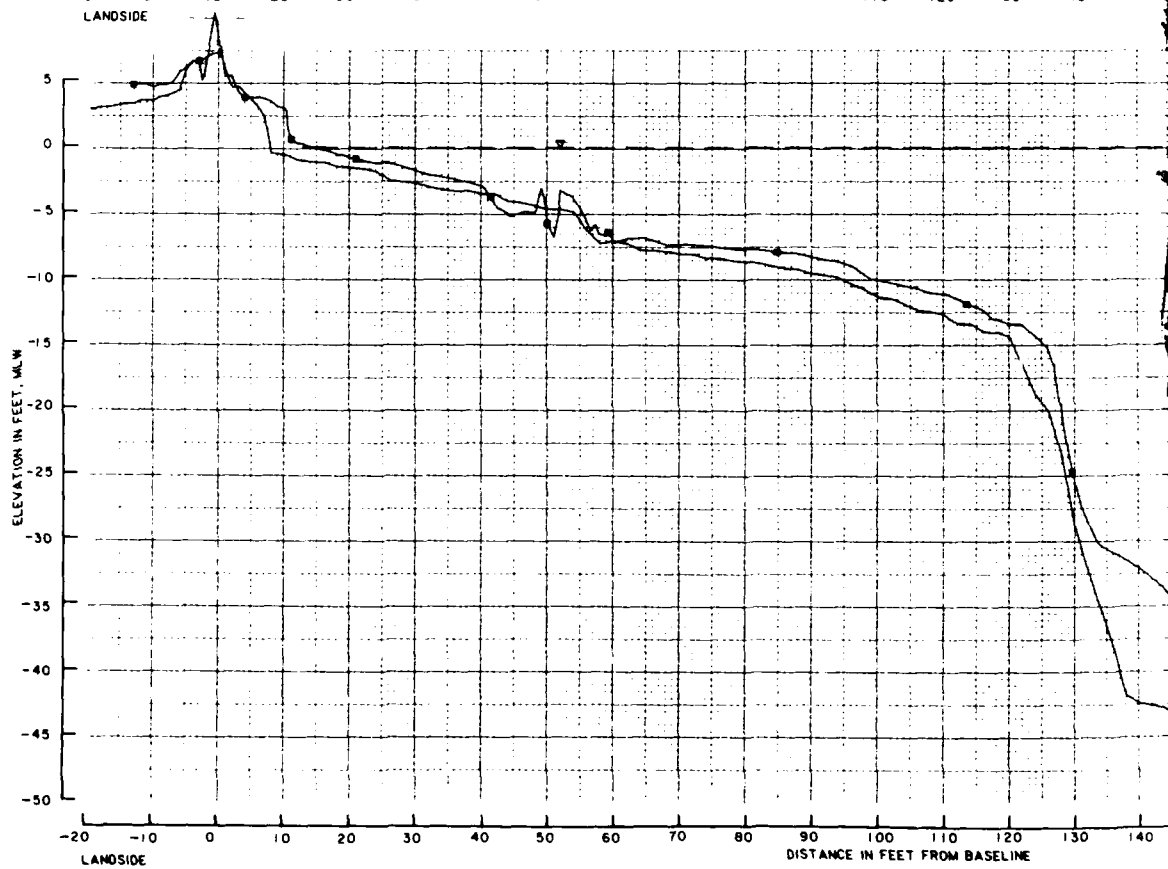
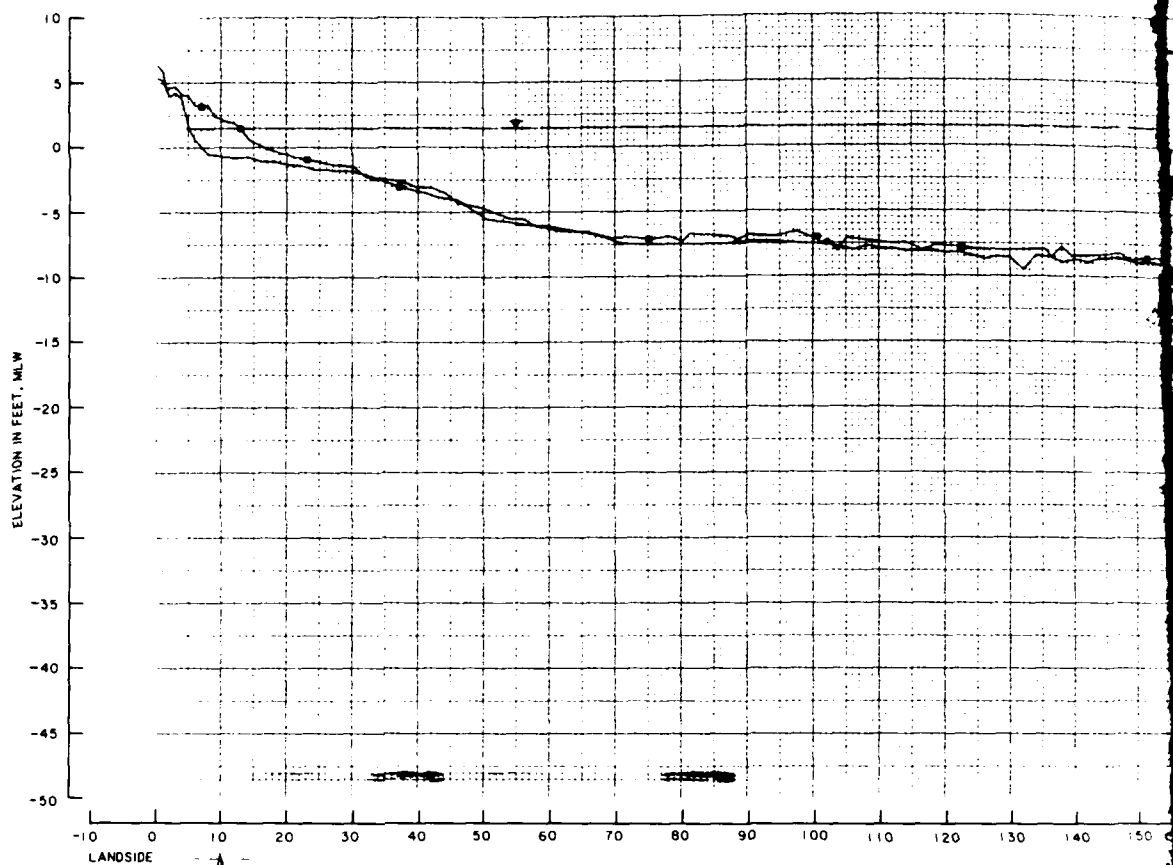


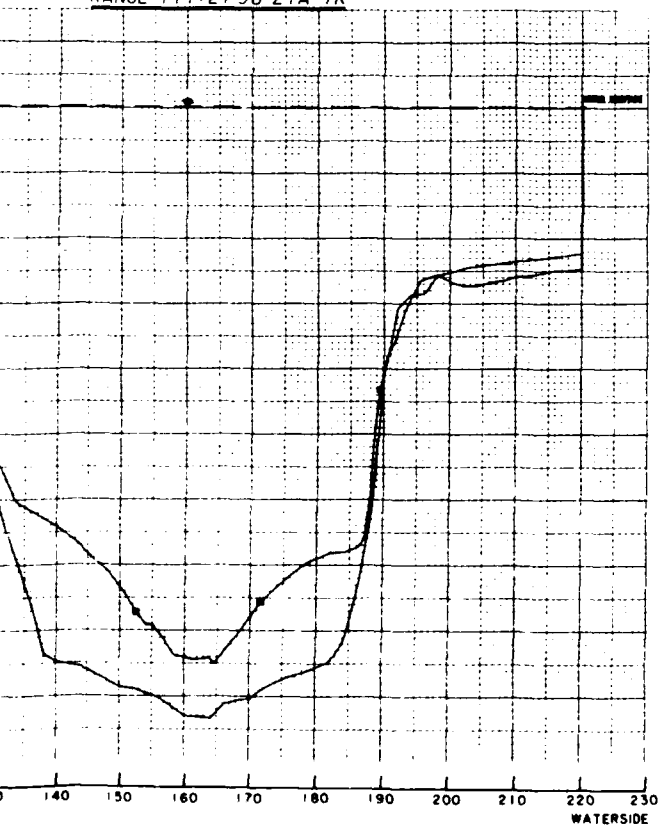
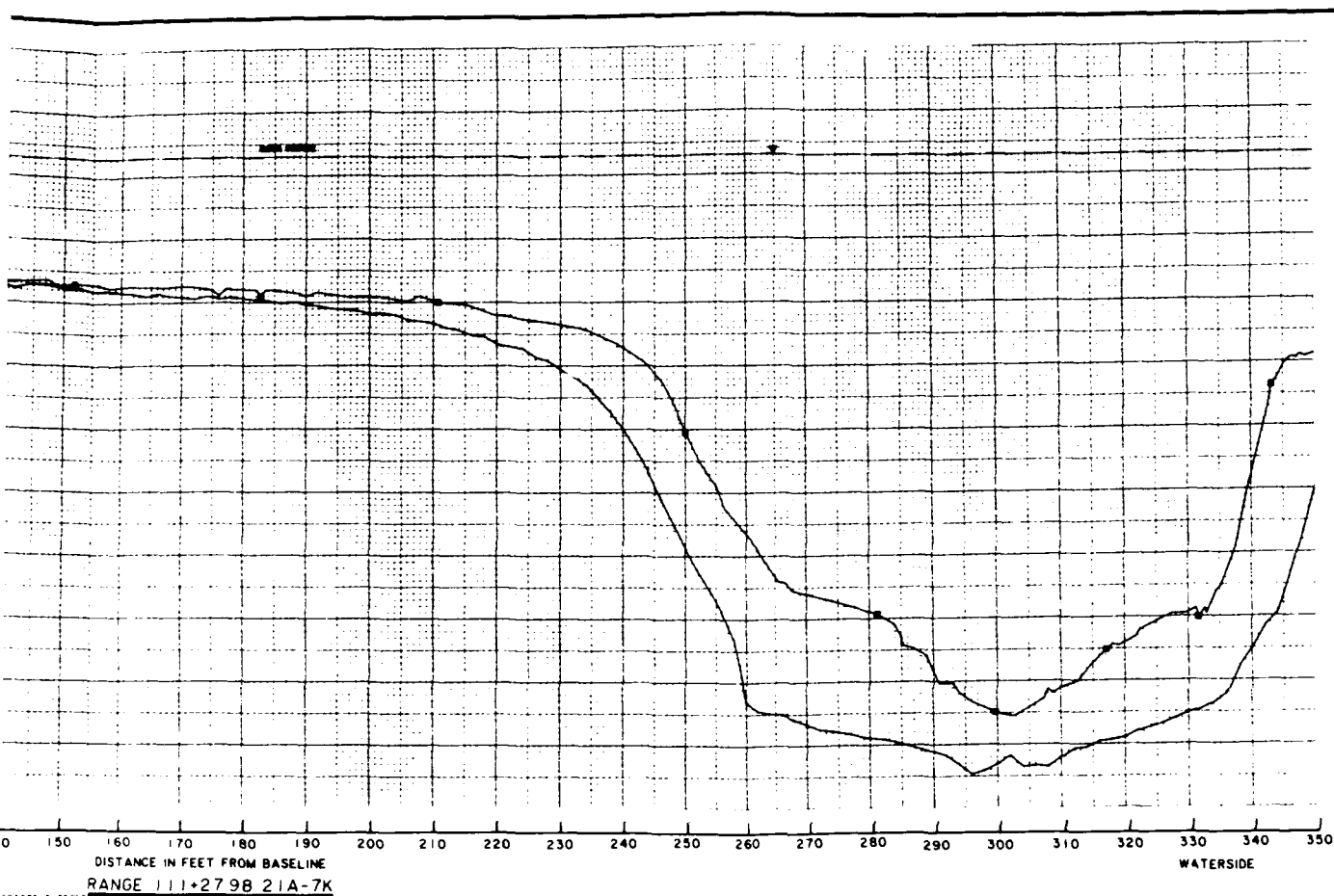
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MOBILE HARBOR, ALABAMA
 GAILLARD
 DISPOSAL ISLAND
 LAND AND HYDROGRAPHIC SURVEY

Figure G2

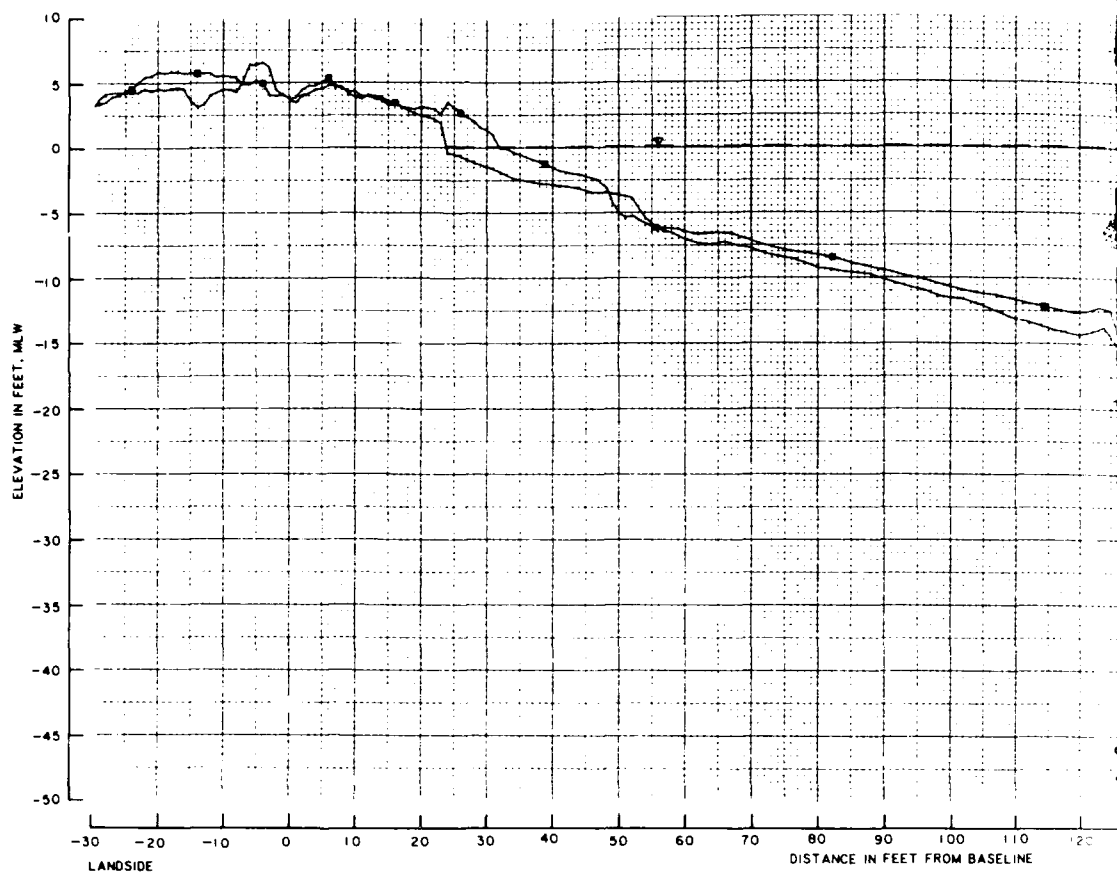




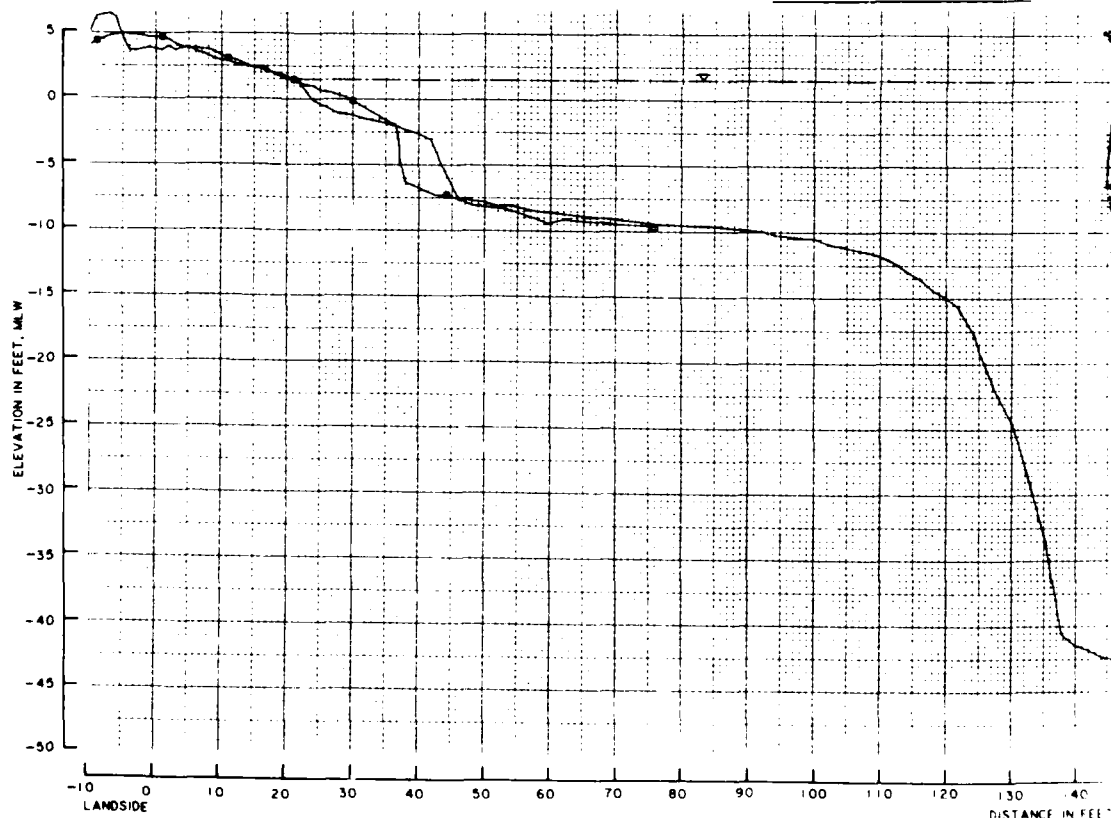
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MOBILE HARBOR, ALABAMA
 GAILLARD
 DISPOSAL ISLAND
 LAND AND HYDROGRAPHIC SURVEY

Figure G3



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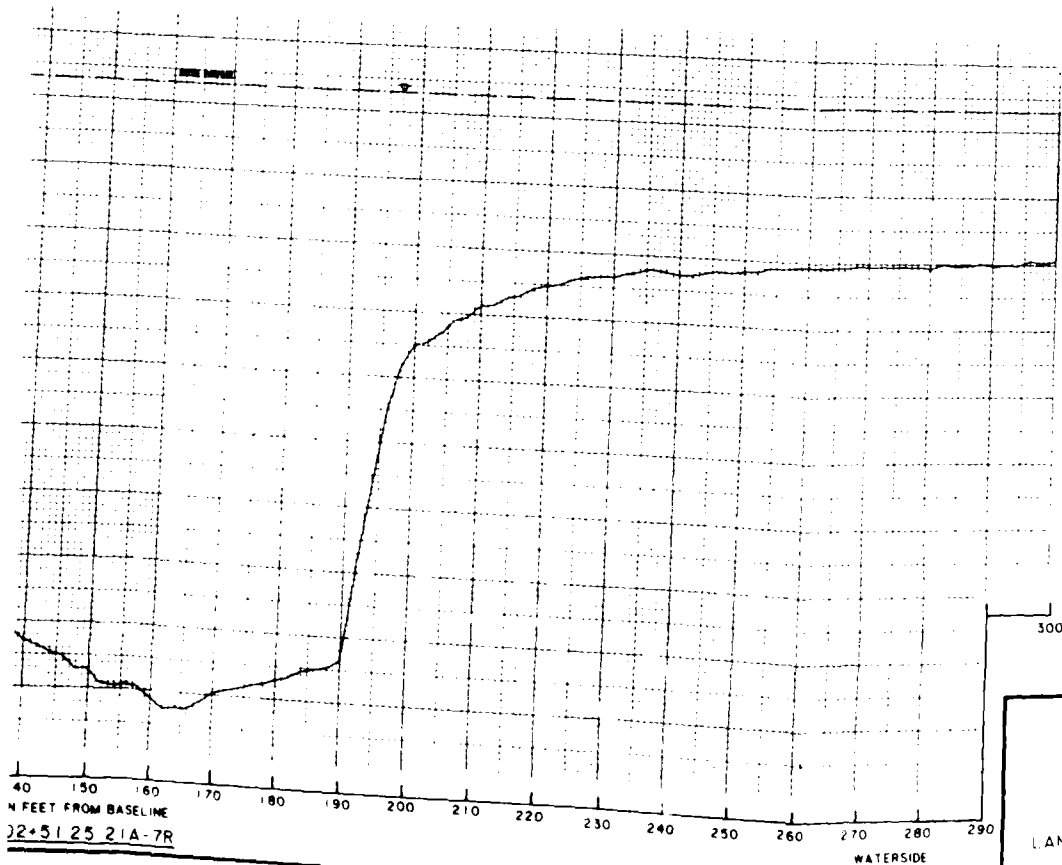
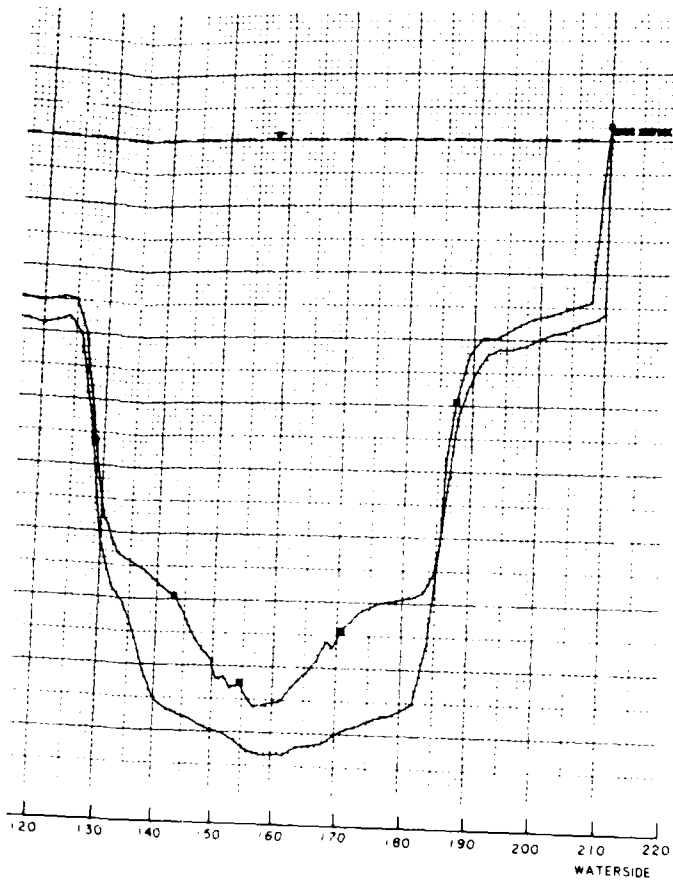
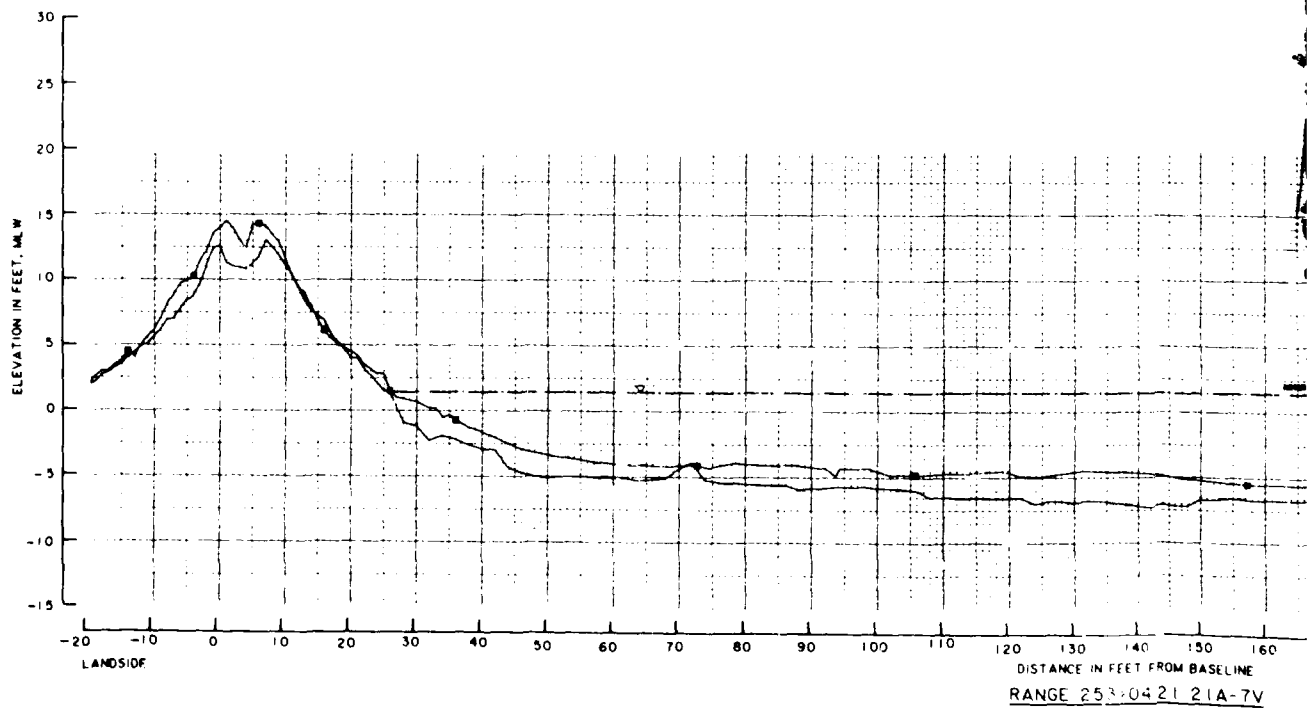
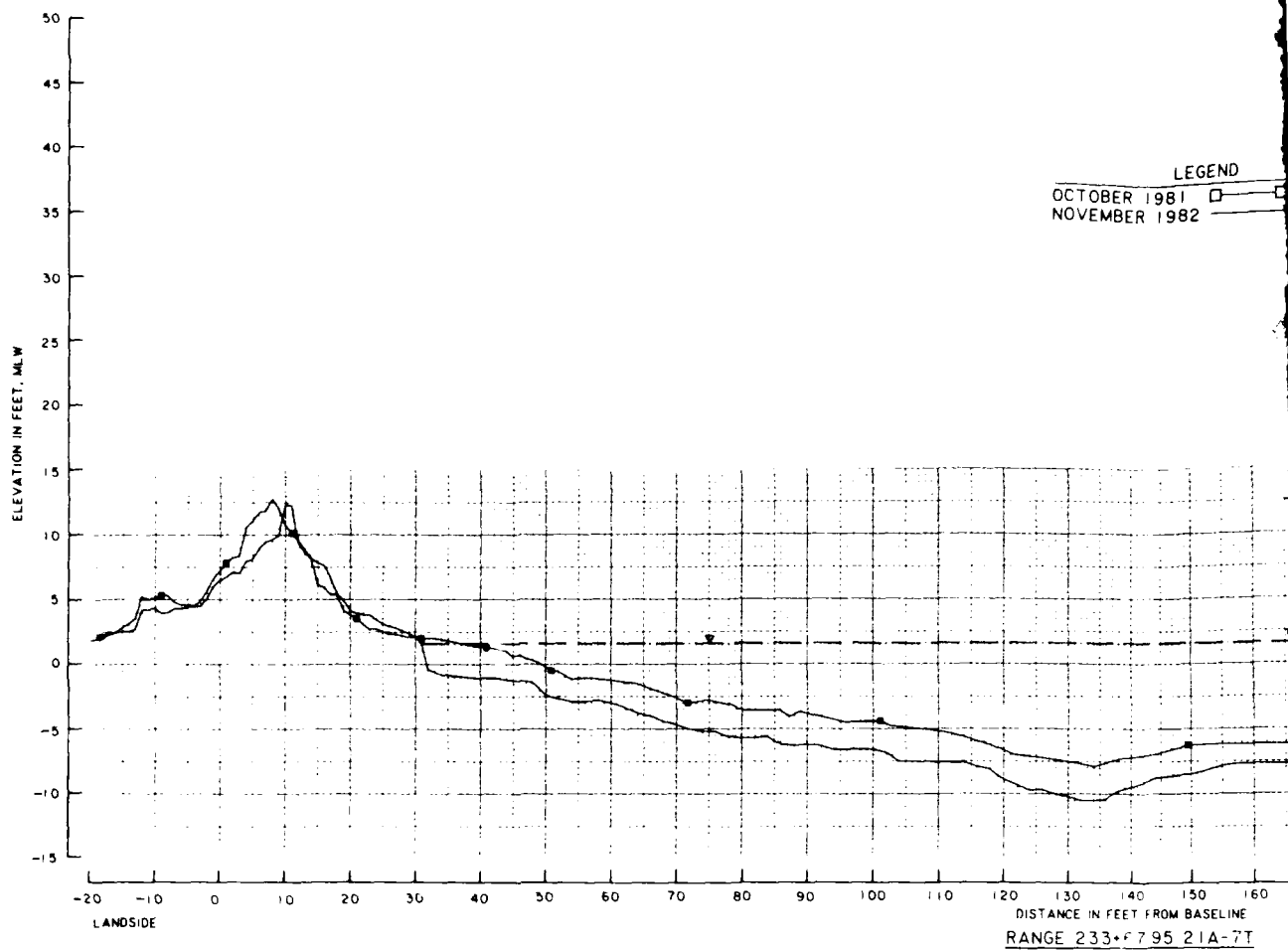


Figure 6a



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VERIFICATION OF DESIGN AND CONSTRUCTION TECHNIQUES FOR

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GOILLARD ISLAND DA. (U) ARMY ENGINEER WATERWAYS

EXPERIMENT STATION VICKSBURG MS GEOTE.

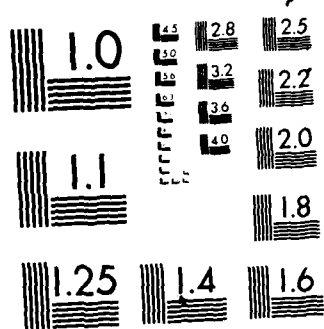
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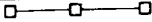

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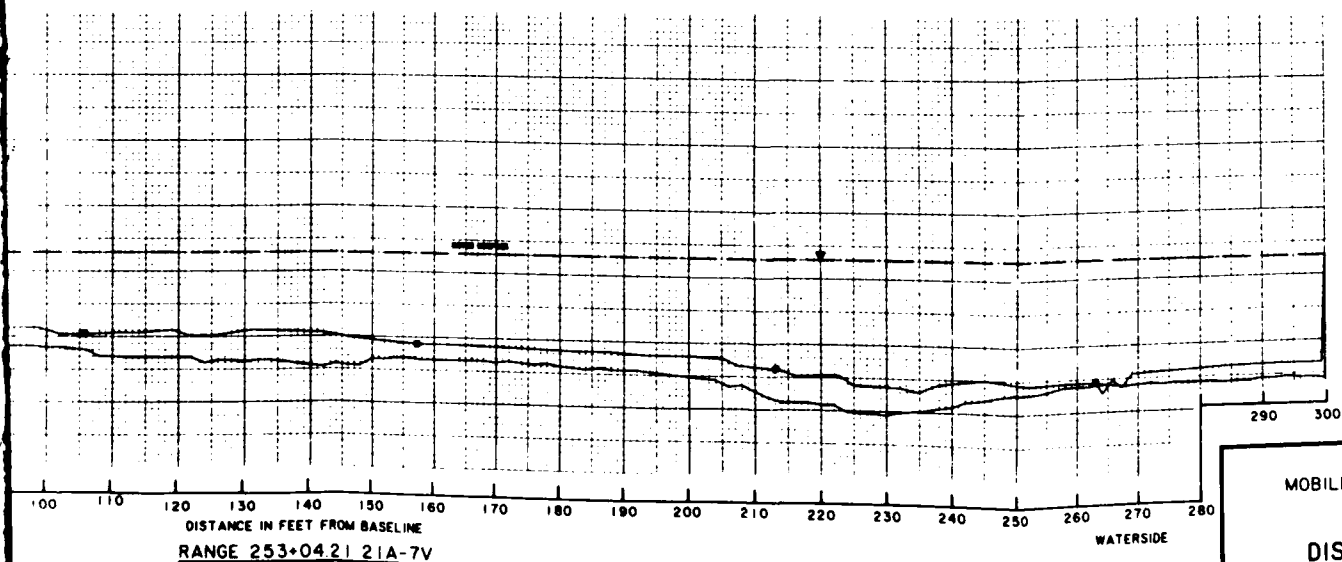
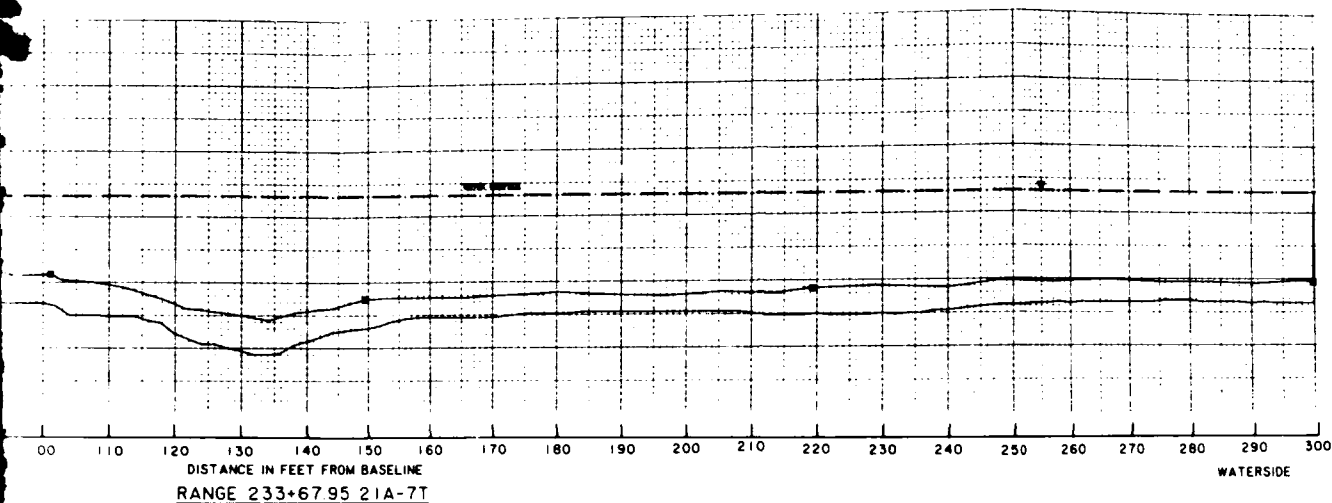
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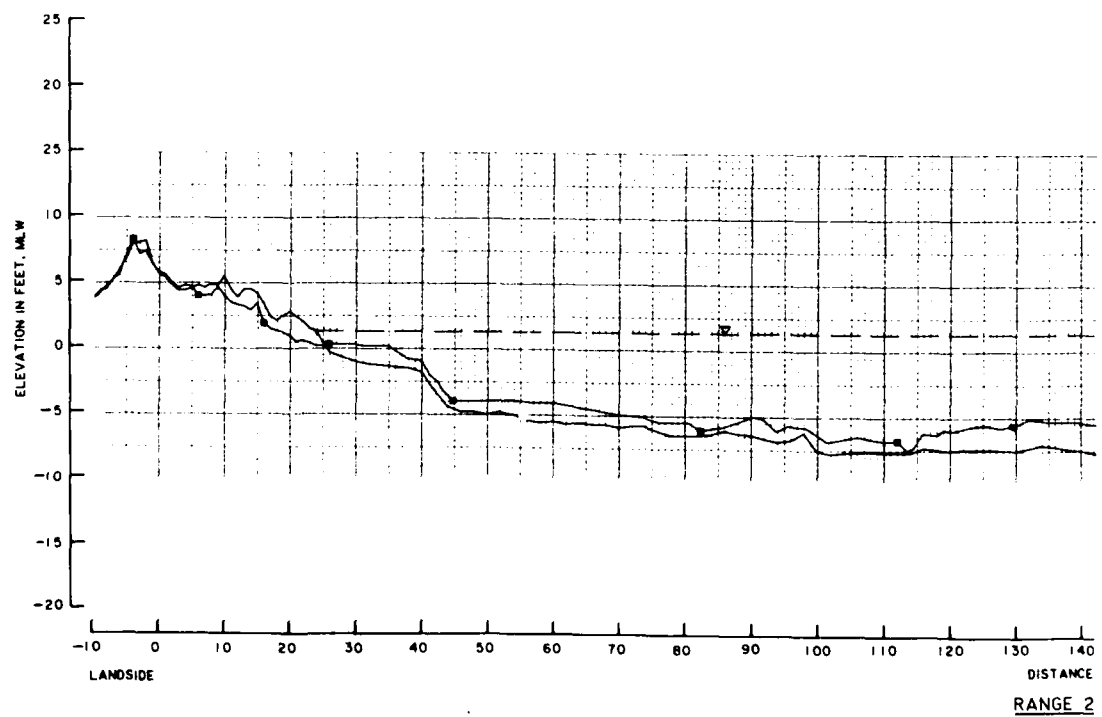
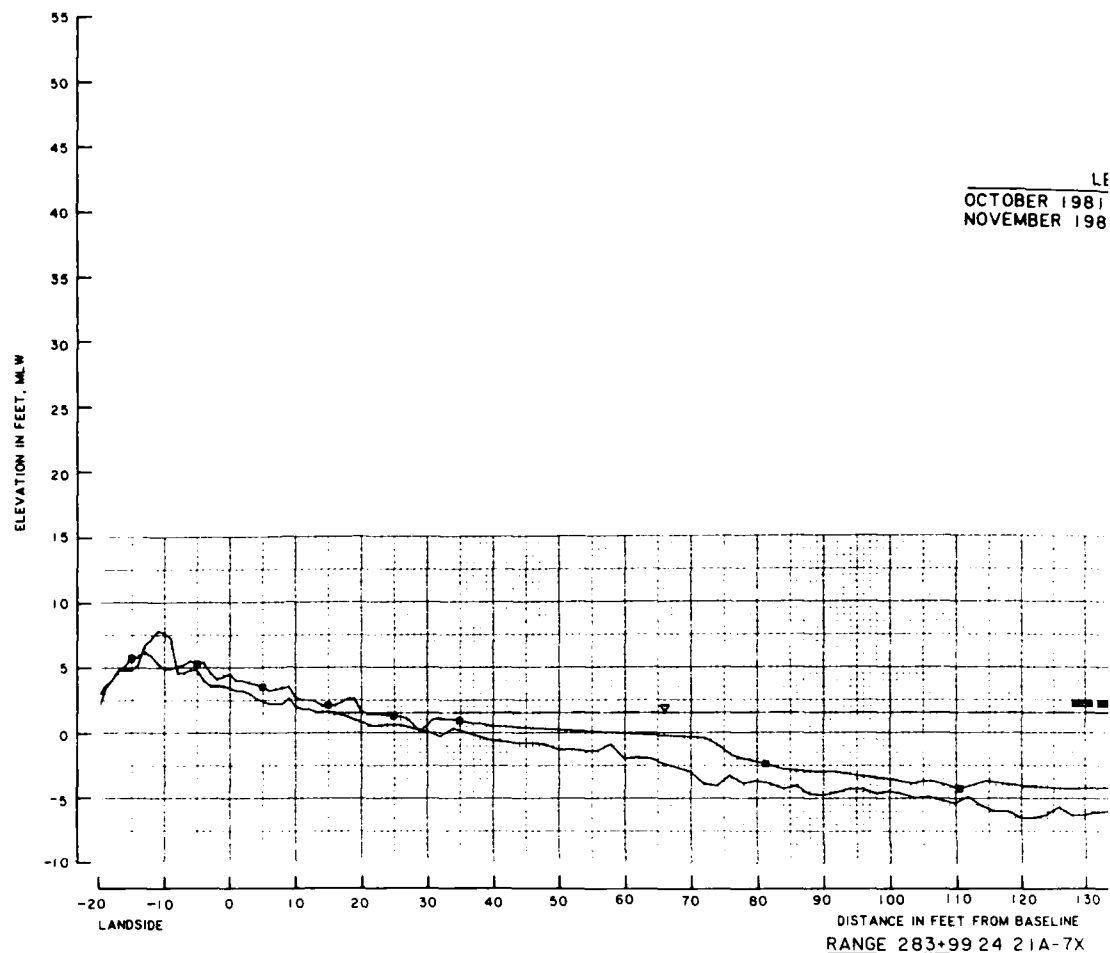


MOBILE HARBOR, ALABAMA
 GAILLARD
 DISPOSAL ISLAND
 LAND AND HYDROGRAPHIC SURVEY

Figure G5

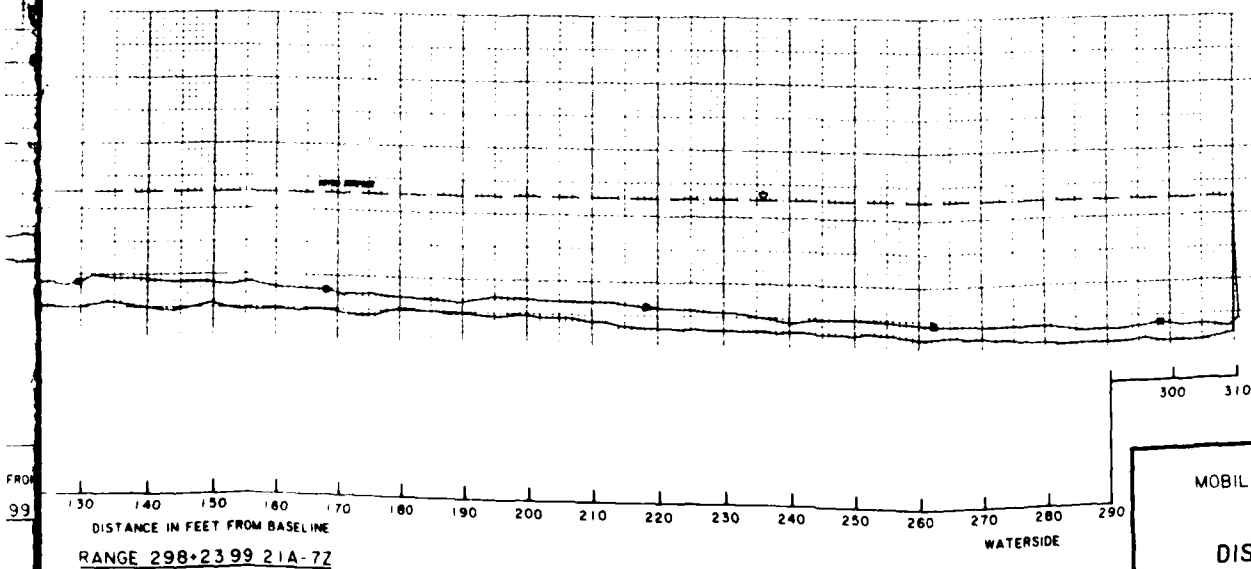
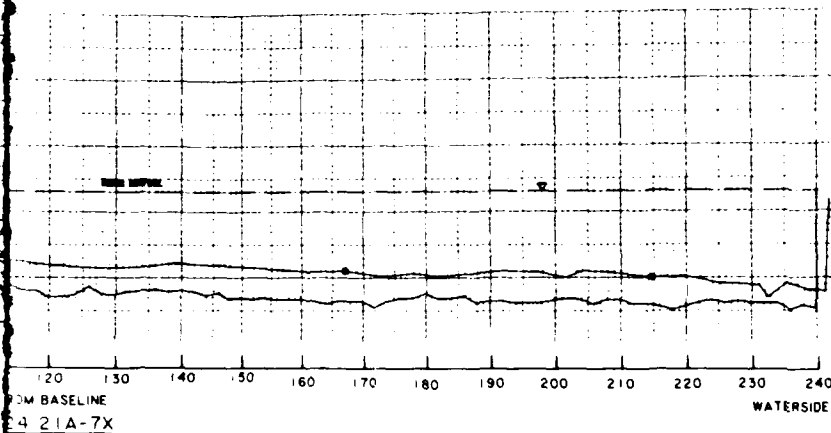
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MOBILE HARBOR, ALABAMA
GAILLARD
DISPOSAL ISLAND
LAND AND HYDROGRAPHIC SURVEY

Figure G6

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